International Journal of American Linguistics

EDITOR
C. F. VOEGELIN
Indiana University

ASSOCIATE EDITORS

PAUL RIVET
Paris

HANS VOGT
Oslo

WILLIAM THALBITZER
Copenhagen

FANG KUEI LI
University of Washington

REVIEW EDITOR
HARRY HOIJER
University of California, Los Angeles

VOLUME 18

1952

Published at the Waverly Press, Inc.
by Indiana University
under the auspices of
Linguistic Society of America
American Anthropological Association
with the cooperation of
Joint Committee on American Native Languages

Int

VOLU

TEST

0. I
1.1. I
1.2. C
1.3. I
1.4. A
1.5. C
2.1. C
2.2. C
3. I

0.1 article probl have by "a ing sa metho metho disco of a stand We a (4) a

* G Philli ciety Turne quite quois; worke now o the A Philos

[1] C. Deter Natur Philos pp. 32

[2] Fo speake having or uni other

[3] Sh

International Journal of American Linguistics

VOLUME XVIII January, 1952 NUMBER 1

TESTING PROCEDURES FOR ESTIMATING TRANSFER OF INFORMATION AMONG IROQUOIS DIALECTS AND LANGUAGES*

HAROLD HICKERSON, GLEN D. TURNER, AND NANCY P. HICKERSON

INDIANA UNIVERSITY

0. Introduction
1.1. Equipment and recording
1.2. Collection of text material
1.3. Preparation of tests
1.4. Administering of tests
1.5. Control of testing
2.1. Comparability of the two tests
2.2. Charts of testing results
3. Preliminary evaluation

0.1. Voegelin and Harris in a recent article list four main methods by which problems of language and dialect affiliation have been and are being approached: (1) by "asking the informant," (2) by "counting samenesses," (3) the "structural status" method, and (4) the "test the informant" method.[1] The last named is directed toward discovering the degree to which members of a given speech community[2] can understand the utterances of members of another. We are making a field report of method (4) as applied to the Iroquois problem.[3]

0.2. The purpose of a six-week field trip in Ontario, Canada, and New York State was to employ the "test the informant" method, utilizing magnetic recording machinery, in determining the intelligibility relationships among seven Iroquois communalects: Seneca, Cayuga, Onondaga, Oneida, Mohawk, Tuscarora, and Cherokee; and to attempt on this basis a grouping of these as languages and component dialects.

0.3. The testing of intelligibility among Iroquois communalects involved three basic steps: collection of textual material, preparation of tests from the material collected, and administration of the tests.

1.1. Equipment consisted of a Peirce wire recorder, an Eicor tape recorder, and various accessories. These included a microphone mixer with four independently controlled input jacks and output connections for both recorders, and three microphones (four would have been desirable); these made it possible to record with several speakers, using either or both recorders. Equipment also included an external foot control for the Peirce, and a Peirce winder; also a shielded wire connection with a plug for the Eicor at one end and clamps at the other—this and an external speaker were used while dubbing.

Field conditions and the constant use of electric apparatus involved in this type of study make a portable power source indis-

* Grateful acknowledgment is made to the Phillips Fund of the American Philosophical Society which enabled Harold Hickerson and Glen Turner to undertake a rather experimental and quite untried type of field work among the Iroquois; Nancy P. Hickerson later joined the field workers in organizing the full field data which are now on deposit in the Franz Boas Collection of the American Indian Languages, at the American Philosophical Society Library.

[1] C. F. Voegelin and Zellig Harris, Methods of Determining Intelligibility among Dialects of Natural Languages, Proceedings of the American Philosophical Society vol. 95, no. 3 (June, 1950), pp. 322-329.

[2] For designating the speech of such a group of speakers, the term communalect will be used, as having no implications of intelligibility (dialect) or unintelligibility (language) with that of any other such group.

[3] Short word lists taken in conjunction with preliminary testing indicate that Tuscarora has several body-part, animal and relationship terms cognate with the other five communalects, while Cherokee has in these categories only one or two tenuous similarities. Though cognates exist, intelligibility between these languages and the others does not.

pensable. The lack of an adequate converter (ours was adequate for one recorder but not for two) cost us in both time and informants in areas with no (or insufficient) local power source.

The usual procedure followed in recording was to record the text as given by the informant on both machines simultaneously; the recording was immediately played back phrase by phrase from the wire for translation taken on a second tape. The original text was transferred to the tape by dubbing, and the informant's translation was recorded through the microphone. (In translating conversation texts, each speaker translated his own utterances.) The final product on tape was a sequence of phrases and their translations covering the whole text.[4]

Of the two uninterrupted recordings of the text originally taken, the one on tape was retained for archiving purposes. The wire recording was used in the testing. In preparing the formal tests, the sections used were cut from the wire and joined in the sequence in which they were to be played (see **2.3**). In administering the tests, much the same methodology was used as in the original recording—stretches of speech were played from the wire machine, and both these[5] and the informants' responses were recorded on the tape. Thus each informant tested is represented by one tape containing his responses to the entire series of test texts.

1.2. Collection of text material was accomplished on an itinerary which included eight reservations in New York State and Canada, the last being the St. Regis Mohawk reservation in New York; here formal tests were prepared; these were administered on the return trip. To show our itinerary we list the reservations visited, followed by numbers which indicate the order of visiting. Thus, we went first to Grand River (1), then to Tuscarora (2), then to Tonawanda (3), then to Allegheny (4), then to Cataraugas (5), then back to Tuscarora (6) which was the second place we had visited—hence more than one number is listed after Tuscarora as well as after other places which we visited more than once.

Grand River (Ontario): 1, 16.
Tuscarora (New York): 2, 6, 10, 13, 15.
Tonawanda (New York): 3, 14.
Allegheny (New York): 4, 12.
Cataraugas (New York): 5, 11.
Onondaga (New York): 7, 9.
St. Regis (New York): 8.
Muncey (Ontario): 17.

As can be seen, it was necessary to visit some communities (notably Tuscarora) more than once in order to obtain the desired selection of texts; in some cases (notably Cayuga) this was never completely achieved. The total body of text material obtained can be described as follows:

Seneca: type A, 4; B, 4; C, 4.
Cayuga: A, 2; B, 1.
Onondaga: A, 2; B, 1.
Onondaga-Seneca: C, 1 (bilingual conversation).
Oneida: B, 1; C, 3.
Mohawk: B, 2; C, 3.
Tuscarora: B, 1.
Cherokee: A, 2; B, 1.

Text type A = formalized texts,[6] such as

[4] Thus, phrase-by-phrase interpreter translations were taken. In a few cases, where an inadequate power source meant that only one recorder could be used, whole-test translations were taken (however none of these were subsequently used in the tests). Linguist translations of the original texts, which would have yielded more detailed analysis of test results, were not made. Our interest was in collecting as wide a range of texts as possible, and the amount of time involved in obtaining linguist translations would have made this impossible. Indeed, at least one separate field season's work with each of the languages would have been a prerequisite to linguist translations.

[5] At this stage it is not necessary to re-record the entire test utterance on tape; only the first few seconds were recorded, for identification purposes.

[6] During the later stages of collecting texts these were not solicited (see **1.3**).

myths and tales; text type B = non-formalized texts, such as personal histories and spontaneous anecdotes; text type C = conversations.

During the course of text collection some general insight into relative intelligibility was obtained partly by preliminary testing and partly by "asking the informant". In preliminary testing, samples of recordings made at previous stops were played to speakers in each succeeding community and informal questions as to intelligibility were put. By this means some degree of intelligibility among Seneca, Cayuga, and Onondaga was indicated.

1.3. After collecting was completed, formal tests were prepared during a one week sojourn at St. Regis. Two tests were prepared, I and II; these were administered to each informant, always in this order.

Test I was designed to test general intelligibility. It consisted of eight two-minute texts arranged in the following sequence: 1. Seneca, B (a description of old customs by Jesse Cornplanter); 2. Mohawk, B (an excerpt from a discussion of a U. S. law affecting Indians, by Ernie Benedict); 3. Tuscarora, B (an anecdote told by Nellie Gansworth); 4. Oneida, C (a conversation about the Christian religion between Mr. and Mrs. Harry Antone); 5. Cayuga, B (a personal history by Mrs. Jane Owl); 6. Cherokee, B (a personal history by Reverend David Owl); 7. Onondaga (during the first few tests given an excerpt from a tale (A) by D. Thomas was used; an excerpt from an address (B) by Percy Smoke was later substituted), and 8. a stretch of bilingual Onondaga - Seneca conversational text, C (Mr. and Mrs. Louis Lyons).[7] The order of the first seven is designed to separate communalects which preliminary observation and testing had shown to be probably intelligible or partly so. The inclusion of the last (which represents learned rather than spontaneous intelligibility) was meant as a test of relative understanding of these two communalects.

1.4. In the administration of test I, each text was played through without interruption, and whole text English translations were requested of the informant.[8] Two minutes was chosen arbitrarily as a length which would permit an informant with imperfect understanding in the communalect involved an opportunity to grasp the area of meaning covered; and not so long that sections at first understood would be forgotten. Subsequently, questions were asked, directed toward discovering words and phrases which an informant (unable to give a complete summary) might have grasped; or, on the other hand, to discover gaps in the understanding of an informant able to give an adequate general translation.

An example of test I follows, being the Cayuga text (no. 5, Mrs. Jane Owl) with Mr. and Mrs. Peter Smith,[9] Oneidas of Muncey, Ontario, serving as informants.

Text, as translated phrase-by-phrase by Mrs. Owl: *Greetings to all of you who understand the Cayuga language. It has been twenty-six years since I have lived here at Cataraugas. I came from Oklahoma. My grandmother came from Canada (Ohswekan) she lived in Oklahoma for forty years, then she went back to Canada. There are not many people who live here that understand the Cayuga language. They all understand the Seneca (Wɑ́·ga) language. When we were children we spoke the Cayuga language, and it was when we went to school that we learned the white man's language.*

Test session (H = Harold Hickerson

[7] Except for the last, an effort was made to confine these to B-type texts, in view of the standardization of folkloristic material and the anacoluthonic nature of conversation. This was not achieved for Oneida.

[8] In the case of informants with an imperfect understanding of the investigator's language it may prove advisable to obtain translations in the informants own communalect; these may be subsequently retranslated.

[9] Testing more than one informant in one session is possibly a disadvantage but was often unavoidable (see **1.4**).

[the interrogator], P = Peter Smith, M = Mary Smith): H. "Mrs. Smith, how much of that did you understand?" M. "Oh, a few words." H. "Do you remember what those words were?" M. "Hmm." H. "Did you understand enough words to get the idea of what she was talking about?" M. "Oh, she was talking about some languages." H. "Yes. Do you know what languages they were?" M. "No." H. "Did you hear her say where she was from?" M. "I thought she said she was from Ohsweken" H. "O.K. How about you Peter?"

P. "Several times she said Ohsweken and spoke of several of the languages that they were taught. I couldn't just make out what she meant by it, whether they were trying to force her to use other languages or what . . .". H. "Did she say anything about when she started talking English, that you understood?" P. "No, I didn't understand that." H. "Did you hear her mention any other language besides Cayuga?" P. "No." H. "Do you know who the people are who call themselves the Wá·ga?" P. "Well, that's what we call the Ojibwa." H. "Well, you got quite a bit of it." P. "Yes I did." H. "If you heard it again do you think you could make even more out of it?" P. "Yes. I didn't understand it like that other fellow, that other man" [refers to preceding Mohawk text.]

Test II was designed to test specific understanding. Whereas in test I the informant was asked for whole-text translation and much leeway was permissible in trying to gauge understanding, in test II phrase-by-phrase translation was required. Test II consisted of a thirty-second stretch of text played in sections of a few words each, after each of which a translation was requested. More than one text was used in most communalects in test II, an attempt being made to present a variety of material. The test was composed as follows:

1a. Seneca, excerpt from conversation (Mrs. Lena Snow and Mrs. Kenneth Snow); 1b. Seneca, excerpt from address (Jesse Cornplanter); 1c. Seneca, a short anecdote (Solon Skye).

2a. Mohawk, excerpt from conversation (E. Benedict and S. Curleyhead); 2b. Mohawk, part of a personal history (E. Benedict, Sr.).

3a. Oneida, conversation (Mr. and Mrs. Chapman Schenandoah); 3b. Oneida, excerpt from personal history (Albert Christian).

4a. Tuscarora, personal history (Wm. Mt. Pleasant); 4b. Tuscarora, anecdote (Nellie Gansworth).

5. Cayuga, personal history (Janie Owl—same as that used in test I).

6. Cherokee, excerpt from Pater Noster (Rev. David Owl).

7a. Onondaga-Seneca conversation (Mr. and Mrs. Louis Lyons, a different part of the same conversation used in test I); 7b. Onondaga, farewell address (Percy Smoke).

An example of test II is the following: Seneca text 1a, given first as translated by the original speakers; second, the test session with Nick Baily of Tonawanda, also Seneca;[10] and third, the test session, using the same text, with Albert Christian and Betsy Antone of Onondaga Reservation, Oneidas.

Text as translated by L = Mrs. Lena Snow, K = Mrs. Kenneth Snow: L. *What are you going to do after a while?* K. *I'm going to start cooking so we can eat.* L. *I'm going to make baskets.* K. *What are we going to eat?* L. *I think we'll have some eggs.* K. *Well, we don't have any eggs.* L. *You'll have to buy some. You drive fast when you go anywhere.* K. *There's no danger when I drive. We'll get back in a hurry.*

The session with Mr. Baily (H. = Harold Hickerson [the interrogator], B. = Baily): H. "Could you translate that for us?" B. *What are you going to do tonight or later?*

[10] This example illustrates how comparison of interpreter translations of several speakers of the communalect in which the text is given may provide an idea of the variation permissible in a "correct" translation.

I will cook a meal. I will make a basket. What shall we have to eat? Let's have eggs. Well, we haven't got any eggs. One said, we'll have to go and buy some, and the other said, we'll have to find some. You drive pretty fast. There's nothing to fear and we'll be back in a hurry.

The session with Mr. Christian and Mrs. Antone (C. = Christian, A. = Antone): H. "Could you translate that, Mrs. Antone?" A. "No." C. "No." A. "No." A. "No. no words." C. *talking about they eat. they're going to eat.* A. "No." C. *Said they're going to eat eggs.* C. "No." A. "No." A. "No, not one word." C. "No." C. "No." A. "No."

1.4. The tests as outlined and illustrated here were administered to twenty-eight persons on 8 reservations, as follows: Seneca, 8 (Allegheny 4, Cataraugas 3, Tonawanda 1); Cayuga, 2 (Cataraugas 1, Grand River 1); Onondaga, 6 (Onondaga 5, Cataraugas 1); Oneida, 6 (Onondaga 2, Cataraugas 2, Muncey 2); Mohawk, 3 (St. Regis 3); Tuscarora, 3 (Tuscarora 3). As far as possible, an attempt was made to deal in the testing with informants singly; however, this was often not convenient or contrary to the preference of the informants. Individuals were tested in seven cases, two simultaneously in eight cases, and a group of five once. In both tests I and II an attempt was made to minimize the shortcomings—such as mutual influence—of dual and group testing by requesting the informants to translate alternate phrases first in test II, and in test I by calling on each informant first for summary translations of alternate texts.

1.5. Controls in testing resolve themselves into two types, selection and contrast applied both to the tests and to the informants. The formal nature of the tests which were given *in toto* to all informants is in itself a control. Informants tested were selected on the basis of living experience in communalects; as far as possible those familiar with only one communalect were tested. This was determined by consideration of background and life history, by preliminary tests, and by their own admission.[11]

Comparison and contrast as test controls were achieved by having each informant translate the texts in his own communalect, as well as the others in the test. From the translations by several speakers in a given communalect of a text in that communalect it was possible to estimate the variability expectable in a valid translation of that text. The same practice also gave a control on the informant's ability in translation into English. If he gave a meagre translation from his own communalect, one could expect less facility from him in general. If he did well with his own, a poor translation of material from another communalect would be significant by contrast.

2.1. In order to make test results comparable on a fixed scale, translations of each text were rated in the following way: in test I they were rated according to a list made for each text on the basis of ideas contained in the several translations (checked against the more detailed phrase-by-phrase translation by the original narrator); in test II translations of each phrase were rated as covering one-third, two-thirds, or all of the possible content. The results of each informant's translation of texts in both tests were converted to percentages and plotted on graphs.[12]

A further step taken (in the process of comparing the results of the two tests) was averaging the results of the two and three texts used for some communalects in test II, thus obtaining a single percentage figure for each communalect in each test.

Allowing for variation due to differences

[11] It might be noted that the cosmopolitan world view as embodied in the Iroquois league seems to incline many individuals to claim polyglot competence. By contrast, they tend to deprecate their knowledge of their own communalect.

[12] With a few exceptions in which results were so unclear (as, for example, when an informant offered commentary rather than translation) as to make it impractical.

between the texts used in the two tests, results of tests I and II are generally highly comparable, with the one consistent restriction that high accuracy in test II is not usually matched by a correspondingly high rating in test I,[13] though general tendencies are largely the same. That is, results of the two tests are more alike at lower levels, less alike when both are high, in which case those of test II are higher. A comparison of test II (specific) and test I (general) lumped averages for Seneca, Cayuga, Onondaga, Oneida, Mohawk, and Tuscarora informants in translation of the texts in these six communalects in that order,[14] illustrates this tendency:

		Seneca	Cayuga	Onondaga	Oneida	Mohawk	Tuscarora
Seneca	test II:	97	85	30	12	12	1/2
	test I:	83	54	27	17	2	0
Cayuga	test II:	70	100	13	15	16	3
	test I:	82	80	2	18	0	5
Onondaga	test II:	30	40	100	23	23	0
	test I:	30	32	100	43	10	0
Oneida	test II:	24	23	10	95	75	0
	test I:	30	7	0	46	45	0
Mohawk	test II:	5	25	0	86	96	0
	test I:	0	20	0	50	82	0
Tuscarora	test II:	2	2	0	0	0	95
	test I:	0	0	0	0	0	83

These results would seem to suggest that informants with accurate understanding in a given communalect might have difficulty remembering all details comprehended in the two-minute text used in test I; by contrast, informants who grasped only part of the content were apparently better able to retain this smaller number of details, and thus gave a clearer picture of their understanding. This would imply that a shorter text—perhaps one minute in length—might have given a truer picture of general understanding.[15]

2.2. A chart of lumped averages from test II of Seneca, Cayuga, Onondaga, Oneida, Mohawk, and Tuscarora informants was worked out; this elaborate chart and the test materials on which it was based are now on deposit in the Franz Boas Collection of the American Philosophical Society Library.

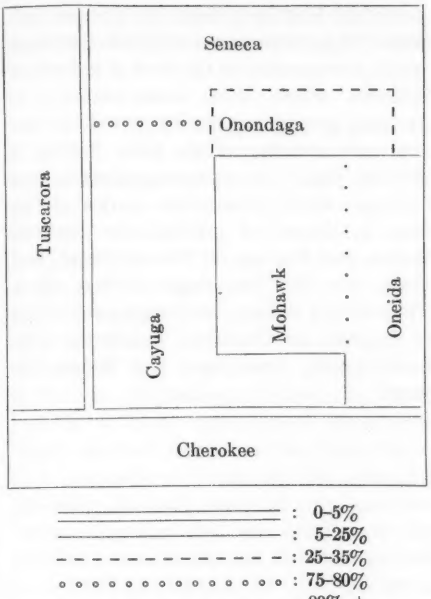
Expressed as a rough diagram, the intelligibility relationships found among these Iroquois communalects are as shown at top of page 7.

3. "Ask the informant" methodology on several occasions gave the impression that Oneida and Mohawk were somewhat closer in intelligibility to Onondaga than to Seneca (and thus, probably, to Cayuga also); this was not borne out by the results of the formal tests discussed so far. It was hoped that tests involving the Seneca-Onondaga conversation text would give a clear picture of this relationship. Unfortunately (probably due in part to the rather vague nature of this conversation) analysis of the results of these tests is difficult. Responses to questions asked concerning relative difficulty combined with a rough estimate of translation performance reveal: Senecas

[13] The exception in the case of Onondaga can be explained by the fact of five informants' being tested simultaneously. Naturally, the product of their combined memories in test I was greater than that of a single individual. In test II each was rated on the basis of responses to only those phrases he was requested to translate.

[14] Translation of the Seneca-Onondaga conversation is here omitted; it is discussed below (**1.3**). Cherokee can be disregarded here, as no Cherokee informant was tested and no informant tested could translate Cherokee.

[15] This was in a few cases confirmed by informants' statements in test I that they had understood words but had forgotten them.



and Cayugas understood all or almost all of the Seneca and approximately one-half of the Onondaga;[16] this was reciprocal with the Onondagas; Mohawks and Oneidas in general (but not all) claimed better understanding of Onondaga, but in no case did translation performance reveal either to be as high as 25–30 percent. Thus the nature of these relations remains unclear; it seems certainly apparent that Mohawk and Oneida are much less close to either Seneca or Onondaga than these two are to one another. It should be stressed that in selecting informants for testing an attempt was made to discriminate spontaneous from learned intelligibility, and informants with polyglot backgrounds were not tested. The latter show local variation according to the amount of contact between communalects. At the Grand River reserve in Ontario, for example, Mohawk, Cayuga, Onondaga, and Seneca are all functioning speech communities, a situation which has prevailed for several generations. Here many individuals were fluent speakers in more than one communalect, and texts were recorded in all four named from one informant, Ezekiel Hill. Similarly, at the Onondaga reservation in New York, where Oneidas have also lived for about one generation, some speech overlapping has occurred, though not to a degree comparable to Grand River.

Another example is the linguistic relationship between Mr. and Mrs. Lyons of Cataraugas. He is Onondaga, she Seneca; they habitually converse, each speaking his own communalect. This, too, is a cultural situation: Mr. Lyons was in contact with Seneca speakers early in life, and Mrs. Lyons learned to understand Onondaga within a few years after her marriage.

Similarly, folklore was seen early in preliminary testing to be widely diffused; ability to translate a myth or ritual text could often be explained by knowledge of folklore (i.e. by inference, from a few words understood), rather than by strictly linguistic understanding. For this reason, collection of type A texts was discontinued and they were little used in testing.[17]

The level at which informants tested claimed understanding when the question "Did you understand that?" was asked, in the test I sessions, varied with individuals; one Mohawk answered affirmatively for Seneca, for which he could give no translation in test I and averaged 4 per cent in test II; on the other hand, one Onondaga replied negatively for Oneida, in translation of which he averaged 48 per cent. In general, however, an affirmative statement usually correlated with ability to translate one-third or more of the test I and II texts in that communalect. This again is in keeping with Iroquois league tradition

[16] This relatively high understanding of Onondaga by Senecas and Cayugas, and of Seneca by Onondagas, can no doubt be explained as due to ability to infer, from the complete understanding of half of the conversation.

[17] This widely diffused folkloristic material was especially important in Iroquois inter-tribal ties, longhouse ritual, etc., being highly formalized.

and feelings of inter-community kinship. One can easily see that statements of intelligibility or lack of it might vary widely according to cultural, class, or even individual situation.

If, then, one chose to define intelligibility by asking the informant if a given stretch of speech were intelligible, one might draw the boundaries of LANGUAGE at as low as 25 percent, thus distinguishing four languages: Cherokee, Tuscarora, Mohawk-Oneida, and Seneca-Cayuga-Onondaga.

On the other hand, if one is to choose an arbitrary point as a definition of intelligibility, it seems impossible to state just what point had best be chosen. For present purposes, 75 per cent seems an all over average which corresponds, on the level of individual speakers within these communalects, to accurate general summaries as well as specific understanding of the tests. Setting it slightly high—i.e. separating Seneca and Cayuga—would obscure the marked difference in degree of intelligibility between Seneca and Cayuga on the one hand, and these two and Onondaga on the other. Thus we are defining the language divisons of Iroquois as Cherokee, Tuscarora, Mohawk-Oneida, Onondaga, and Seneca-Cayuga.

SOME INITIAL PHONES AND COMBINATIONS IN UTAZTECAN STEMS

J. Alden Mason

University Museum, University of Pennsylvania

0. Introduction
1. e in PT
2. p in PT
3. tš in PT
4. kw in PT
7. l ~ r in PT
6. w in PT
7. y in PT
8. Reflexes of homorganic clusters in PT

0. In 1913 the late Edward Sapir published the first part of his Southern Paiute and Nahuatl; A Study in Uto-Aztekan,[1] probably the first study of any American Indian language that was handled in the detailed scientific method that had proved so fruitful in research on Indo-European and a few other great linguistic stocks. He established rules of sound shift, posited the original phonetic system of Utaztecan, and thus placed on a firm basis of proof the hypothesis first advanced by J. C. E. Buschmann in 1859.[2]

As regards the Utaztecan languages of Mexico, sometimes called "Sonoran" (and ignoring the "Shoshonean" family), these studies were used as a basis for further research by Kroeber[3] and by myself.[4]

Of all the "Sonoran" languages, those of the Pima-Tepehuan family,[5] including Pima, Papago, Tepehuan and Tepecano, are by far the most variant, the most different—in phonetics, at least—from Nahuatl, and presumably from original Utaztecan. On the other hand, there is slight variation within this group.

Sapir posits no more than four rules of sound-shift for any of the Sonoran languages, but for Pima-Tepehuan eight such shifts are proposed.[6] These are: 1) UA ə > PT ə [turned ə is used throughout in place of two dots over i]; 2) UA p > PT v; 3) UA ts,tš > PT s, š; 4) UA kw > PT b; 5) UA s > PT h; 6) UA l > PT r; 7) UA w > PT g; 8) UA y > PT d.

I have always regretted that Sapir did not find more examples of these eight sound-shifts,[7] to establish their validity beyond question, especially the three that develop for Pima-Tepehuan a full set of sonant stops, missing in other Utaztecan languages. Recently the absence of certain otherwise expectable combinations of these latter as initial in stems rose from the unconscious to the conscious plane of my mind, as a result of which I have examined Pima-Tepehuan stems, as regards their initial phones, especially the consonantal ones, and certain initial consonant-vowel combinations.

According to the eight rules of sound shift established by Sapir (with a modicum of aid from myself), stems beginning in e, p, ts and tš, kw, l, w, and y should be missing in Pima-Tepehuan. Those beginning in initial

[1] JSAP, n.s., X, 379–425, Paris, 1913. The second part appeared in *idem*, XI, 443–488, 1919, having been earlier published in two sections in the AA, 17, 98–120, and 306–328, 1915.

[2] Die Spuren der Aztekischen Sprache, Berlin, 1859; Grammatik der Sonorischen Sprachen, Berlin, 1864.

[3] A. L. Kroeber, "Uto-Aztecan Languages of Mexico," Ibero-Americana: 8, Berkeley, 1934.

[4] The Classification of the Sonoran Languages (with an Appendix by B. L. Whorf), Essays in Anthropology in Honor of Alfred Louis Kroeber, 183–198, Berkeley, 1936.

[5] According to the classification adopted in my The Native Languages of Middle America, The Maya and Their Neighbors, New York, 1940, pp. 81, 82, the Piman family belongs to the Utaztecan stock, Azteco-Tanoan sub-phylum, Macro-Penutian (?) phylum.

[6] The best tabulation of these is in Kroeber, *op. cit.*, p. 4.

[7] A few more are given in Mason, 1936, pp. 187, 188.

original Utaztecan s should be missing also, but s (and š) should be present according to rule 3, in conformity with which original Utaztecan ts and tš became s (or š).

1. The vowel e is practically missing in all the Pima-Tepehuan languages, being uniformly replaced by ə. In Tepecano[8] and Southern Tepehuan e is a rarely heard variant for the diphthong ia. In Northern Tepehuan it occurs a little more frequently as a variant of the diphthong ai; it is generally in final position, never initial.

2. As I have already remarked,[9] initial p in stems is extremely rare in these languages. Most of the few examples are of loan words and the others are, naturally, under similar suspicion.

3. The affricative ts is missing in all the Pima-Tepehuan languages, and tš is rare except in Pima and Papago where it occurs as the regular reflex of t before ə, i, and u; the sonant form dj is also found as a regular variant of d in similar combination. In Tepecano two nouns were recorded with stems beginning in tš; analogous forms in the other languages could not be found as a check. In Northern Tepehuan a few examples in initial position were found, generally as a development from palatalized t^y. It is especially common in the independent negative, heard from different speakers as šo, šu, t^yo, tšo *No*! The examples found initially all precede the vowels ə and i, thus possibly showing an approach to the fully functional Papago pattern. An interesting example is $tšov^wa$ *cave* (uniform rendering). Compare with Tepecano təhof, Papago tšə(h)o.

4. True kw is probably missing in all the Pima-Tepehuan languages. No examples of this orthography were found in Pima and Papago, the analogous forms of which eliminate from consideration certain equivocal Tepecano words beginning in kua- and kui. In Northern Tepehuan one verb form beginning in kwik- *to stoop*, was consistently so written; it could not be checked in the other languages.

5. It is hardly correct to say that r is the Pima-Tepehuan reflex of Utaztecan l. Many Sonoran languages have been written with both l and r, and I have suggested[10] that both may have to be posited for original Utaztecan. The phone is sometimes intermediate, some hearers hearing and writing r, others l.[11] In Nahua as well as, apparently, all the other Utaztecan languages, l ~ r is proscribed as an initial sound, additional evidence—if any were needed—of the validity of the stock. Sapir gives no example of l or its reflexes as initial in a stem, and remarks that "original l . . . seems nearly always to have been postvocalic."[12] In both Tepecano, Northern Tepehuan, and Papago several examples—almost always of loan words—are found with initial l (r is the normal Tepecano and Tepehuan reflex).

6. Initial w has been written in almost all the Pima-Tepehuan languages, but apparently never as a reflex of Utaztecan w. In Papago, v is generally written before a and i, w before ə, o, and u, and in Tepecano I tended to follow the same pattern. However, w is often heard for a diphthong commencing in vu, as wa for vua, wi for vui. The latter development was also noted in Northern Tepehuan. However, in the Nabogame dialect of Northern Tepehuan, the initial bilabial sonant continuant was more often written as w than as v before all vowels.

7. As a true glide, y seems to be missing in initial position in Pima-Tepehuan stems. No examples of y thus used have been found in Papago or Tepecano, although there are a few equivocal examples of initial ia and iə. In the Nabogame dialect of Northern Tepe-

[8] J. Alden Mason, Tepecano, A Piman Language of Western Mexico, Annals of the New York Academy of Sciences, XXV, 309–416, New York, 1917.

[9] J. Alden Mason, The Language of the Papago of Arizona, Museum Monographs, University Museum, Philadelphia, 1950, p. 80, footnote 18.

[10] Mason, Classification, especially p. 189; Kroeber, p. 4, footnote 9.

[11] Mason, Papago, pp. 9, 10.

[12] Sapir, 1919, p. 477.

huan, however, all such words were written as beginning in ya or yo. They presumably have no connection with Utaztecan y.

8. However, it is in the absence of certain otherwise expectable initial phonetic combinations in Pima-Tepehuan that the validity of certain of these rules of sound shift is most clearly demonstrated. We have seen that, according to these rules, a complete set of sonant stops is developed in Pima-Tepehuan by the following shifts: UA kw > PT b; UA w > PT g; UA y > PT d. To go directly to the point, it may be stated that the combinations bo, bu, gu and di, with a very few exceptions that may be explained away as adopted words or assimilations, are missing in Pima-Tepehuan stems, at least in initial position. There is surely no phonetic reason why these combinations should not be as frequent as those of b, g, and d preceding any of the other vowels, these all being rather common.

From an historical linguistic or philological point of view, however, their absence is easily explicable. The missing combinations are all developed from homorganic combinations, vowels preceded by their identical semivowels. According to the rules of sound shift, the development is as follows: UA kwo > PT bo; UA kwu > PT bu; UA wu > PT gu; UA yi > PT di.

All these original combinations, kwo, kwu, wu, and yi, are also missing in initial position in stems in Nahua, as indicated by their absence in Rémi Siméon's Dictionnaire de la Langue Nahuatl, and as verified by several students of modern Aztec from the Summer Institute of Linguistics.

It is obvious, therefore, that the reason for the absence of the combinations bo, bu, gu and di from the Pima-Tepehuan languages—at least in initial position, an absence inexplicable on phonetic grounds, is due to the absence of their original forms kwo, kwu, wu and yi in original Utaztecan. This fact lends additional proof—if more were needed—to the validity of these rules of sound-shift in Utaztecan philology.

The fly in the ointment is the frequent occurrence of initial go in the Pima-Tepehuan languages when, by analogy with bo (from kwo), it would not be expected to be present. Its Utaztecan original form, wo, seems to be absent in classical colonial and in modern Aztec, at least as initial in stems, and I have been unable to find any cognate forms by which any rule for the development of Pima-Tepehuan initial go could be deduced. There are at least two such stems found in all the languages of this group: go·'k *two*, and go'goši or go'ɢs *dog*, as well as several others that have been found in one or two languages of the family.

The case for the absence of initial di is also not quite conclusive since one pan-Pima-Tepehuan stem with this beginning is known to me, that for mother's younger sister: Northern Tepehuan di'šika, Tepecano di'ška, Pima-Papago djisk. Another possibility is Northern Tepehuan di'via, Pima-Papago dji'via or dji'ya *to come* (singular subject). The latter might be "explained away" as a later variant of the possibly more original Tepecano du'via. A similar elimination from consideration of the former example as variants from the possibly more original Tecolote Papago (Juan Dolores) dialectic form djəsk might seem to smack of special pleading.

ATHAPASKAN AND SINO-TIBETAN

ROBERT SHAFER
BERKELEY, CALIFORNIA

0. Introduction
1. Final -a
2. Final -wa
3. Final -i
4. Final -u
5. Final -o
6. Final -ui
7. Final -ei
8. Final -e
9. Final -ai
10. Final -k
11. Final -t
12. Final -p
13. Final -ŋ
14. Final -n
15. Final -m
16. Final -l
17. Final -r
18. Final -s
19. Inferences about finals
20. About initials
21. Additional comparisons

0. For many years anthropologists have held that the American Indians, or at least a large part of them, came from Asia by way of the Aleutian Islands. So far this theory has rested on the geographical link between the two continents and on racial and cultural traits. If the theory is correct, one would expect to find some linguistic parallels, and Edward Sapir once or twice mentioned that he had discovered such evidence. But so far none has been published; his manuscript notes are in Harry Hoijer's possession.

In working on possible Penutian borrowings from Athapaskan some five years ago, the writer was struck by the correspondence between the Athapaskan root *sai *sand* and the same word in some of the southern Sino-Tibetan languages (Burmish, Daic).[1] As the Daic (=Thai) languages are an aberrant division of Sino-Tibetan, with a considerable word stock which bears no obvious resemblance to other members of the Sino-Tibetan family, this parallel (*sai) seemed a possible clew to these divergencies.[2] Further investigation, however, revealed more parallels between Athapaskan and Tibeto-Burmic than between Athapaskan and Daic.[3]

The data presented here is not extensive. If it were, it would be suspect a priori. For if one computes the time it probably took for the languages involved to become as divergent as they now are, I think all will agree it runs into the millenniums. If any verbs ever existed in Sino-Tibetan meaning *to handle a long object, to handle a cloth*, etc., such as one finds in Athapaskan, I have failed to note them. Moreover the flora and fauna in the Sino-Tibetan and Athapaskan regions are almost altogether different so that comparisons of this class of words are necessarily almost entirely eliminated. And, although a large number of texts of various Athapaskan languages have been collected, the repetitive style of many results in extremely limited vocabularies. Under the circumstances, one will probably never have parallels between the

[1] Since some 300 Sino-Tibetan languages and dialects have been recorded, some approach to a scientific classificatory nomenclature seemed necessary to guide the reader through the maze of names. For this, see JAOS 60.306 (1940), n. 14, par. 2.

[2] André G. Haudricourt, Les phonèmes et le vocabulaire du thai commun, Journal Asiatique 236–7 (1948), thought that the genetic relationship of the Daic languages is to be sought among the Man and Yao, the Annamese and Muong, and some minor languages on or near the east coast of Asia, but he presented no original comparisons.

[3] This impression may have been unduly influenced by the present writer's specialization, which is in Sino-Tibetan, particularly Tibeto-Burmic.

two families, and if we find a few which are phonetically and semantically close it is all that we may expect at present.

Phonologically Athapaskan and Sino-Tibetan have this in common: phonetic reactions are different for the same primitive consonant in a prefix, as a stem initial, and as a stem final.[4] Although the Athapaskan vocalic system has not been worked out in detail, it is known that some languages of that family have two and others three lengths of vowels.[5]

Kukish has two lengths of medial vowels, and three lengths of vowels have been recorded for some of the Himalayish languages.

The following comparisons are of simple roots or stems.[6] Despite the difference in concepts of action in the two families, it is believed that the number of verb parallels is striking.[7]

1. Final -a

1.1. Kato ka-' *motion up* (48), Chip.

[4] See Li, Mattole, 5–6, and Hoijer, S. Ath. Lang., top p. 76 (fn. 7, below).

[5] Li, Mattole, 40 (fn. 7, below).

[6] "Stem" in Sino-Tibetan comparative grammar refers to the "root" plus the "prefix".

[7] Sources: Athapaskan—The Franciscan Fathers, An Ethnologic Dictionary of the Navaho Language (Saint Michaels, Ariz., ca. 1910); Pliny Earle Goddard, Elements of the Kato Language, UC-PAAE 11.1–176 (1912); Harry Hoijer, The Southern Athapaskan Languages, AA 40.75–87 (1938); Hoijer, Navaho Phonology, UNMPA, no. 1 (1945); A. P. Laurent Le Goff, Grammaire de la langue montagnaise (Montreal 1889); Le Goff, Dictionnaire françaismontagnais (Paris, etc., 1916); Fang-kuei Li, A Study of Sarcee Verb-Stems, IJAL 6.3–27 (1930); Li, Mattole, An Athapaskan Language (Univ. Chicago, 1930); Li, A List of Chipewyan Stems, IJAL 7.122–51 (1933); Li, Chipewyan Consonants, Studies Presented to Tsai Yuan-pei on His 65th Birthday, Academia Sinica, NRIHP, pp. 429–67; Emile F. S. J. Petitot, Dictionnaire de la langue dènè-dindjié (Paris 1877); Edward Sapir, Notes on Chasta Costa Phonology and Morphology, U. Penn. Anthrop. Publ., Vol. 2, no. 2, pp. 273–340 (1914); Sapir, Pitch Accent in Sarcee, JSAP, n. s. 17.185–205 (1925); Sapir, Internal Evidence of the Northern Origin of Navajo, AA, n. s. 38.224–35 (1936); Sapir and Harry Hoijer, Navaho Texts, Wm. Dwight Whitney Linguistic Series, Vol. 8 (Iowa City, Ia., 1942).

Sino-Tibetan: bibliography in Linguistic Survey of India, vol. 3 (Calcutta), under name of each language; and a more recent bibliography in Stuart N. Wolfenden's Outlines of Tibeto-Burman Linguistic Morphology (London 1929).

Most of the Athapaskan works cited above are to some extent comparative. Li, Mattole, and Hoijer, Southern Athapaskan, have done most toward the reconstruction of Athapaskan consonants. No formal work seems to have appeared on Athapaskan vocalism.

The chief comparative work on Sino-Tibetan is Shafer, The Vocalism of Sino-Tibetan, Journ. Amer. Oriental Soc. 60.302–37 (1940), 61.18–31 (1941); Problems in Sino-Tibetan Phonetics, JAOS 64.137–43; The Initials of Sino-Tibetan, JAOS 70.96–103; Phonétique comparée de quelques préfixes simples en sino-tibétain, Bull. Soc. Ling. de Paris 66. fasc. 1.144–71. For Sino-Daic, K. Wulff, Chinesisch und Tai sprachvergleichende Untersuchungen, Danske Videnskabernes Selskab, Hist.-filolog. meddelelser, vol. 20, pt. 3 (1934).

For Daic (Thai) comparative work, see Henri Maspero, Contribution à l'étude du système phonétique des langues thai, Bull. Ecole Fr. d'Extrême-Orient 11 (1911), and André G. Haudricourt, Les phonèmes et le vocabulaire du thai commun, Journal Asiatique, 197–238 (1948).

For reconstruction of Ancient Chinese, see Bernhard Karlgren, Etudes sur la phonologie chinoise, Archives d'études orientales, vol. 15 (1915); Karlgren, Analytic Dictionary of Chinese and Sino-Japanese (Paris 1933) (numbers in parentheses in this article refer to this dictionary); Karlgren, Grammata Serica, Bull. Mus. Far East. Antiquities, no. 12 (1940) (referred to here as GS); and Henri Maspero, Le dialecte de Tch'angngan sous les T'ang, Bull. Ecole Fr. d'Extrême-Orient 20, no. 2 (1920).

For comparative grammar outside of phonetics, see Shafer, Studies in the Morphology of Bodic Verbs, Bull. Sch. Oriental and Afr. St. 13.702–724, 1053–1067 (1951).

Abbreviations: Ath., Athapaskan; Bu., Burmese; Ch., Ancient Chinese; Chip., Chipewyan; Chir., Chiricahua; ChC, Chasta Costa; Him., Himalayish; impf., imperfective; Jic., Jicarilla; K., Kukish (a section of Burmic); KA, Kiowa Apache; L., Lušei (a Kukish language); Lip., Lipan; Lou., Loucheux; O. B., Old Bodish (classical Tibetan); Mat., Mattole; Mesc., Mescalero; Mont., Montagnais; Nav., Navaho; perf., Ath. perfective, Sino-Tibetan perfect; S., Siamese; Sar., Sarsi; SC, San Carlos; ST, Sino-Tibetan; TB, Tibeto-Burmic; Wail., Wailaki; W. B., West Bodish. Other abbreviations denote directions, as W., West.

Abbreviations for northern Athapaskan dia-

-kà *surface.*[8] O. B. k'a *on*, above; surface, m-k'a *sky*.

1.2. Kato, Hupa, Wail. -ta' *father*, Chip. -tá, Sar. -tą', Mat. -txá', Nav. -txà·' (Li), Mat. -ta', Nav. -tà·', SC, Chir., Mesc. -tà·, Jic. -kà'-é· (Hoijer 76), Mont. -t'a (with pers. prons.), Hare -t'a. Ath. *t-. O. B. 'a-ta;[9] W. B. 'a-ta, Rgyarong a-ta-ta; Ch. ˌt'ịa (1006) S. *ta·* *mother's father*.

1.3. Sar. -da, -dà', -dî', -dìš *to win* (Li 18). Lao dâ· *to bet*.

1.4. Chip. -nà- (pp.) *front* (Li). K. *m-Na, Mikir iɒ-no[10] *in front of, before; face;* S. hnà·[2] front, before; face.

1.5. Nav. -má *mother*.[11] O. B. ma, 'a-ma, Tsangla a-ma; W. Him. a-ma; E. Him. -ma, ma; Barish ma; K. *mà; Ch. *ma (592); etc.

1.6. Kato ya' *sky* (19), Chip. yà (145), Nav., Chir., Mesc., Jic., Lip. yá, SC yá·, Mat. ya· *cloud* (Hoijer 78), ChC ya·-, ya- *up (in the air)*, Hupa ya-, Kato ya'- (ChC), Mat. ya-, ya·- *up, upward* (Li, Mat. 54). O. B. ya *above, up*.

1.7. Mat. ya-, ya·- *all* (3d pers. pl. pref.) (Li, Mat. 65). K. *ya, L. za *all*

1.8. ChC ga-łał-'é *crow*, ga-sá·'-tš'u *raven*, Nav. gâ·-gi· *crow* (17). Barish -k'a; O. B. k'wa-ta; S. ka·, Lao ká·

1.9. Mat. da-, da·- prefix referring to water, liquid (Li, Mat. 56). Ch. d'â *to flow* (Shih ching) (GS 4 k).[12]

1.10. Nav. tá· *completely*, Mat. da- pref. with verbs of doing to mean *to finish*. K. *-ta forms past tenses, L. -ta pluperfect; Bahing -tă past time; Almora -ta.

1.11. Chip. -'à, -'á, -'à *to fool*, Mat. -'à', -'aɣ, -'aɣ, -'a', Sar. -'ą', -'ą·i (-'ąg-), —, -ątš (Ath. *-x, -ɣ). L. a *a fool, foolish*; Bu. 'ă *dumb;* Ch. ''a *dumb* (209). ST *'ă.

2. Final -wa

2.1. Mat. gwo- prefix referring to place or weather (Mat. 61). K. *k'ua, L. k'ua *village, country*, K. *k'ua, L. k'ua *weather*.

2.2. Mat., Wail. -ɣwo' *tooth*, Nav. ɣwò·' tooth, bî-wò·' *his teeth* (Hoijer, N. Ph. 17), Kato wo·' *tooth*, Lou. œ-ɣwo, Sar. -ɣwù', Mont., Hare é-ẏu, Chip. xù-, -ẏù-, -ẏú. Garo wa-, Tipura wa, Dimasa ha-; K. *hà, L. ha (but Khoirao -ɣa, Ao *fa); Bu. swà; West Himalayish *swa. Tibeto-Burmic *s-'wa? *s-ɣwa? In both Athapaskan and Tibeto-Burmic we find a guttural or laryngal assimilating a w which formed part of the root.

3. Final -i

3.1. Chip. tsì *vermilion* (144). O. B. rtsi *paint;* Bu. tš'è.

3.2. Kato -tši·, -dži· simple interrogative in: *why? who? what? when? where?* (34). O. B. tši *what? why? how?*

3.3. Mat. t'si· *stick, bush*. Tsangla tši *grass*; Thebor tši, Kanauri tši·', Kanaši tši'. Semantically cf. Spanish *yerba*.

3.4. Nav., SC -tì', (same) *to talk*, Chir..

---

lects are A., Athabaskaw; B., Bâtards; C., Castors (Beaver); E., Esclaves (Slave); F., Flancs-de-chien; K., Kolouches, esclaves du lac Kɣaylon; M., Montagnards, or Dènè of the Rocky Mountains; P., Porteurs (Carrier); S., Sékanais.

Phonetics: To accommodate the transcription to the style of this journal, ST ś has been changed to š; ā, ē, etc. to a·, e·, etc. Old Bodish ā, h*h* have usually been transcribed *h* in the past; for pronunciation see my Prefixed n-, ng- in Tibetan, Sino-Tibetica no. 1 (Berkeley, 1938). Accent marks in Hupa, Wailaki, and Mattole denote stress; in Sarsi, á, a, à denote the high, middle, and low tones respectively; in Navaho, á and à denote the high and low tones; Bu. à is the "falling" tone; K. à = Bu. "falling" tone. Ch. ˌa, 'a, a' = level, rising, falling tones. Karlgren's transcription of Ancient Chinese has been followed; Chinese comparisons have been reduced to a minimum and characters omitted to save expense; they may be found in Karlgren's works, to which reference is made.

Semicolons separate Sino-Tibetan divisions and sections.

[8] Tlingit ka *on*.

[9] Desgodins' dictionary.

[10] *-a > Mikir -o.

[11] Hoijer, N. Ph. 11; Nav. Texts 5.80, 101. Cf. Mont. e-xaŋ, Beaver é-maŋ, Slave é-moŋ, Hare é-xoŋ = é-moŋ, Flancs-de-Chien é-moŋ; nasalized vowel due to initial?

[12] Sonant stops are always aspirated in Karlgren's transcription of Ancient Chinese. The aspiration is not etymologically significant.

Mesc. -tì, (same), Jic. -kì', (same), Lip, -kì, (same), KA -tšì, (same), Chip. -tài, (same) (Ath. *t—y') (Hoijer 83). K. *ti, L. ti *say*.

3.5. Kato dí· *this* (34), Mat. di· *this, these* (Mat. 133), Chip. dì-rì *this* (Li), Nav. di· *this one* (N. Ph. 27). O. B. ādi *this*.

3.6. Mat. -ni·(y)-, da'ní·ye' *woman's dress*, Kato ɬa-ni· *skirt*. K. *-hni *petticoat, skirt*.

3.7. Kato yi· *right here*, ha yi· *that one, those* (34), Mat. yi· *that, those; he, they* (Mat. 133), yi (or -i- as second part of diphthongs) 3d pers. obj. with 3d pers. subj. (unexpressed) (Mat. 64), Chip. i- (root) 3d pers. indep. pron. (Li), Mont. é-yi *ça* (dem. pron.), Hare é-yí, Lou. e-y. W. B. hni *this*.

3.8. Mat. -ni· *person* (postpositive particle) (Mat. 138). K. *-mi, L. mi; O. B. mi, Rgyarong -rmi; Dimasa mi-; Banpara mi; W. Himalayish *mi.

3.9. Mat. si-, se·- *death* (modal prefix used in verbs of killing) (Mat. 66), Chip. -ðìy-é. O. B. ši (perf.) *to die;* Bu. se; K. *t'i, L. t'i; Ch. 'si (959); etc.

3.10. Kato hi· *the* (34), ChC hi· *that* (dem.) (Sapir, Ch. C.). K. *hi, L. hi *this, he*.

3.11. Mat. ni- *your*, Chip. ni- 2d pers. indep. pron. Ch. 'ni (14).

4. Final -u

4.1. Kato, Hupa qo· *worm* (Kato 16), Mont. gu, Hare g'u. Ahom kŭ *worm;* Bu. k'u *caterpillar;* K. *ku.

4.2. Sar. -gù' *be foggy, smoky* (perf. pres.) (21). K. *k'ù, *smoke, vapor*, L. -k'u; Bu. -k'uì; Rgyarong -k'u; etc.

4.3. Chip. ɬθù, ɬθù^{w}-é *breast, milk*, Mont. ɬθu *breast*, Mat. -ɬso·' *breast, milk*, Kato t'so·' *milk*, Wail. -t'so', Hupa -t'so·', Sar. -t'su- (Li 10). Mikir tšu *to suck*, tšu-bov *nipple, teat*, Maring tšu tšu yui *milk* (yui *water*); Bu. tšuì' *to suck* (*as an infant*); Katšin tšu *to suck; milk; breast*.

4.4. Chip. dzù *woman's private parts* (144). K. *t'šu *vulva, vagina*, L. tš'u; Vayu džu-džu *vulva*.

4.5. Kato u·-, o·- 3d pers. poss. pron. (sg. or pl.) (21). O. B. hhu, hho *this*.

5. Final -o

5.1. Chip. -dù *hot*, Nav. -dò *be hot* (Hoijer, N. Ph. 26). O. B. dro-ba *warm*.

5.2. Nav. ɬlò' *grass*, Sar. gùɬlùwú, Mat., Hupa ɬlo', Wail. ɬo' (Ath. *ɬl-) (Mat. 14). K. *hlo *weed, grass*, L. hlo; K. *X'lo *to weed*, L. t'lo.

6. Final -ui

6.1. Nav., Chir., Mesc., Sar. tó *water*, SC tó·, Mat. -tχo', Jic., Lip. kó, KA kó·, Chip. tù (Hoijer 76, Mat. 128), Kato to· (20), Mont. t'u (tš'u) = t'iw (C.) = t'ü (E.M.) = t'u (Hare, Alaeka, S., C., P.), F. t'i, (Ath. *t-) K. *tuì; L. tui *water*, Bu. twe *to flow*.

7. Final -ei

7.1. Mat. -tse' *penis*, Hupa xwé·-dze', Wail. -se' (Mat. 11). O. B. mdže.

7.2. Mat. -ne· *mother*, Mont. e-nén = é-né (C.), Hare e-né = é-nnè (M.). Bu. 'ă-mi < *-mei.

8. Final -e

8.1. Chip. -kè, -ké *foot, moccasin*, Mont., Hare é-k'é *foot*, Lou. a-kγé, Mat. -kχé', Wail. -ke', Kato kwe', Nav. -kè·' (Li), Nav. ké-, -kè·' *foot, shoe*, SC ké·, -kè·, Chir., Mesc., Jic. ké, -kè·, Lip. kí, -kì·, KA -tšé·-, Hupa χe·-, -χe', Sar. ká-, -kà' (Hoijer), ChC -hwä. (Ath. *k-). K. *ke, L. ke *foot, leg*.

8.2. ChC -ne *to bite, seize with one's teeth*. K. *ne, ne·k' *eat, drink;* Newari nye *eat*, Pahri *ne*.

9. Final -ai

9.1. Kato sai *sand* (20), Nav. sái (S.), Chip. θài (138). Mont θay = θa (E.), Hare fwa = fa (M.), Lou. séy. Bu. sai; Katšin zai, k'um-tsai (Hn.), kum-sai (N.), s'ai-brue (Hz.); S. dra·y (spoken sai), Lao dža·y (spoken sai) *sand, gravel*.

10. Final -k

10.1. Kato la' *hand* (22), Mat. -la', Nav. ă-lă' (F.), ChC lh, Chip. -(ǹ)-là, -(ǹ)-lá, Mont. iṇ-la, Hare lla, Lou. œn-llè. Bu. lak; O. B. lag-pa; Mišing ă-la·k, Yano lak; Tšairel lak; Newari la·; Katšin lă-ta.

10.2. Kato -no·' *behind* (40). Bu. nok *space behind.*

10.3. Mat. -ni' *face* (Mat.). O. B. mig *eye;* Baric *mik; K. *mik'?, L. mit, Mongsen -nik, Tengsa -nyik; Newari mi; Katšin mi'. Or:

Kato -na' *eye* (22), Hupa, Wail. -na·', Mat. -na', -na·g-, Nav. -ná·', Sar.- náγàk' is *one of the eyes,* Chip. -nà-, -nàγá, Mont. é-naγ-è = (in comp.) é-na = ku-nda (E.) = é-da-yé (C.) = e-nda (Sarsi), Hare e-ta = é-ta (B.) = ku-ṇta = (in comp.) e-na = é-na (M.), Lou. œ-ndè = (in comp.) œ-na, SC -ⁿdá·, Chir., Mesc., Lip. -ⁿdâ·, Jic. -ⁿdá·, KA -dá·' . Bu. myak [13]

10.4. Sar. -tsìk' *to build a fence,* -tsì· (-tsìk'-), -tsì· (-tsìk'-) *put pickets around, fasten tent door-flap by putting in a stick* (Li 23). O. B. rtsig *build.*

10.5. Mat. -bo'ł, -bo'd, -bo'd, -bo'ł *to burst, break into pieces* (85).[14] K. *puak, L. puak; Bu. pok (intr.), p'ok (tr.); Bahing pwak-ko, puk-ko (tr.), buk-ko (intr.); Katšin bo.

11. Final -t

11.1. Mat. -t'so·s, -t'so·'ts, -t'so·s, (same) *suck, sip,* Chip. -t'θúθ, (same), (same), -t'θúiθ *suck* (Li). Bu. tšut.

11.2. Nav. -ƚè·d, -ƚé·d *copulate,* Mat. -ƚe·' or -ƚe·d, -ƚe·d, -ƚe·l, -ƚe·' (Mat. 43, 106). O. B. skyed *generate, procreate* (tr. to skye *be born*).

11.3. Mat. -ƚo·' (impf.), -ƚo·'d (perf.), -ƚo·l, -ƚo·' *suck,* Hupa -ƚod (impf.), -ƚot' (perf.) (Mat.), Kato -ƚo·t (72). L. du·t, do·t *suck up* (*as cattle, etc., do water*); S. tu·t (spoken dụ·t) *suck;* Ch. ƫwät *suck up* (1235).

11.4. Sar. -ƚù' (d-), -ƚú' (d-), —, -ƚù·ž, -ƚùdi *to smoke* (Li 19), Nav. -ƚó·h, -ƚòh (N. Ph. 36). O. B. dud-pa, du-ba *smoke.*

11.5. Kato gi·ts *to tie.* K. *t-k'it; Katšin gi·t.

12. Final -p

12.1. Mat.-kχa'ł, -kχa'd, -kχa'd, -kχa'ł *to sew* (103), Nav., SC -kàd, (same), Jic. -kà', (same), KA, Lip. -kà, (same).

12.2. Mat. -gwo' *stoop down.* Mikir -hop < *k'up *low, stooping,* ar-kup *stoop, go on all fours;* Bu. kup *bowed down, to crouch;* Mišing gub *stoop, bend the head;* Ahom k'up *kneel down.*

13. Final -ɒ

13.1. Mat. -ƙa·n (*mountain*) *ridge* (130). Ch. ˌkâɒ *mountain ridge* (304); O. B. sgaɒ *hill;* Bu. k'aɒ-.

13.2. Mat. -kaɒ', -ka·n, (same), -ƙaɒ' *to burn, build a fire* (Mat.), Sar. -ƙą (n-), (same) *to burn,* Nav. -ƙą·', Chir., Mesc., Lip. -ƙą, SC -ƙą́, Jic. -ƙą', Chip. -ƙą́ih, -ƙą̀· (Ath. -n') (Hoijer no. 27).[15] K. *ka·ɒ *to burn* (tr., intr.), L. ka·ɒ; cf. Bu. kaɒ *broil, toast.*

13.3. Kato -ląñ *get* (63). O. B. len (pres.), b-laɒ (perf.) *receive, get, obtain* ($\sqrt{\text{laɒ}}$).

13.4. Kato -bʌɒ' *be full* (69), Hupa -men, miɒ, Mat. -biɒ, -bi·'n, -bil, -biɒ' *be or become full,* Nav. (F.) -bĭn, -bĭn, bĭł *to fill.* ST *pliɒ: K. *pliɒ,* Mikir pleɒ *full;* Bu. prań' < *pliɒ'; Katšin p'riɒ (Hz.) (*-l- > Katšin -r-); S. plĕɒ[1]; Dimasa p'ulŭɒ *fill.*[16]

14. Final -n

14.1. Kato -'i·ɒ — *to look,* Hupa -en, -iɒ (Kato), ChC — 'i· *see, look at,* Mat. -'iɒ', -'i·'n, -'i·l *look for.* K. *en *look, see,* L. en, Šiyang en, in.

14.2. Kato kwo·ɒ' *fire* (16), Hupa xoɒ, Mat. kχoŋ', Nav. kòⁿ' (Sapir by Hoijer, N. Ph. 10), Chip. kún, Mont. kγon = kγwon (P., Sarsi) = kγun (C.), Lou. kγwon = kγon (A.) = kγan-é (K.), Hare kγoṇ.[17] S., Lao gwăn *smoke;* Ch xụən (174).

15. Final -m

15.1. Kato -kąn, kʌn be *sweet* (78), Hupa ła-xá·n *sweet* (Mat. 103), Mat. kχa·n *be sweet or bitter,* Nav. łł-kàn- *it is sweet* (N. Ph. 21, par. 2; Nav. Texts 2.6),

[13] Or should one compare S., Lao hnà· face? At present it is difficult to say what the Athapaskan root is.

[14] For the "conjugation" of this verb in Mattole, cf. 12.1 below.

[15] Tlingit gAn.

[16] *-i- > Dimasa -u-.

[17] Tlingit ġa·n.

-kà·ⁿh, -kà·ⁿd *to sweeten* (N. Ph. 35). Ch. ‚kâm *sweet* (298); Rawang gəm *be tasteful.*

15.2. Kato -sʌɒ *think*, Hupa -siɒ or -sin, -siɒ' or -se'n, Mat. -si·n, -si·'n, -si·l, Sar. zì·n, (same), Nav. -zìn, -zį', Chip. -δὲn, -δį, (same), (same) (Li), SC, Chir., Mesc., Jic., Lip., KA -zį. O. B. sems *think*, sems *soul, mind*, Tsangla sem *mind*, Rgyarong -sems pre *think;* Ch. sjəm *thought, intelligence* (801); K. *t'iam, L. t'iam *know, know how to.*

15.3. Mont. kuṇ-é *house* (also C.) = k'iṇ-é (E.), Hare kγuṇ-i = k'iṇ-é (F.), Lou. (in comp.) kγéṇ = kγuṇ. O. B. k'yim; Mišing, Abor e-kum; Andro kem, Sak kyi·n, Kadu kyin; Mru kim; etc.

16. Final -l

16.1. Chip. -t'θàł-é *finger* (141), -t'sàł-é, sè-kὲlt'sàl-é *my toes* (145), Mont. iṇ-la-t'θał-é *finger*, é-k'é-in-t'sał-é *little toe*, Lou. iṇ-lé-ɬθég = iṇ-lé-džéll *finger*. K. *M-tšal *finger*, L. -tšal.

16.2. Nav. xé·ɬ *pack*, bì-γé·l *his pack* (N. Ph. 34), Sar. -γáł *to pack, carry on one's back*, -gà', -gí(n-), -gáł, —, -gàhi *carry, travel with a pack* (17, 20).[18] O. B. āk'el *pack on, load*, āgel (pres.), bkal (perf.) *to load, lay on a burden.*

16.3. Chip. -tsìł, -tsèl, -tsìł, (same) *soak, wash; get soaked* (l); *wash (oneself)* (l) (144), Sar. -tsíł, (same), —, -tsíłtš, -tsíli *wash* (24). K. *r-sil, L. sil *wash;* O. B. bsil *wash (face, mouth, feet)*; Newari sil- *wash;* Katšin šin *wash, bathe* (*-l > Katšin -n).

16.4. Chip. -γùl, ἔδγùl *windpipe, trachea.* O. B. mgul *throat.*

17. Final -r

17.1. Mat. di- (pref.) (*to stand*) *perpendicular* (57). K. di·r *to stand, be upright*, Haka di·r-.

17.2. Sar. -zú· *be sour* (Li 22). K. *t'u·r, L. t'u·r; W. Him. sur-.

17.3. Mat. -bó·x, —, -bó·x *there is a blister* (84). O. B. ābur-po *protuberance (boil, postule, etc).*

[18] I doubt if this second Sarsi verb is related to the first.

17.4. Mont. dé-khor *arrondi*, O. B. āk'or, skor *circle.*[19]

18. Final -s

18.1. Kato ko·s *cough* (20), Mat. -kχos, (same), (same), (same) *to cough*, Chip. δε-kwòθ *a cough*, -kwòθ, (same), -ku·òθ *to cough* (Li), Nav. -kos, (same), (same) (F.), Sar. -kús, -kúst, -kús, -kúšt (21), ChC xwʌθ, Carrier xwœs (Sapir, Ch. C.) (Ath. *k—s). Barish gusu; K. *m-r-k'us, L. k'u'.

18.2. Nav. -ké·s, -kìz *to crack* (Hoijer 84), Mat. -ke'ts, (same) (106). O. B. āges (pres.), bkas (perf.) *to split; divide* (tr.), āgas *to split, to crack* (intr.).

19. We may draw the following inferences from the above comparisons concerning finals: (1) ST -a = Ath. -a, except (2) ST -wa = Mat., Wail., Kato, Nav. Lou. -wo = Sar. -wu = Mont., Hare, Chip. -u; (3) ST -i = Ath. -i; (4, 5, 6) ST -u, -o, -ui = California and Southern Athapaskan -o = Northern Athapaskan -u. Possibly ST -ui develops differently in some Northern Athapaskan languages; (7, 8) ST -ei, -e = Ath. -e; (9) ST -ai = Ath. -ai; (10) ST -k = Ath. -'; (11) ST -t = Ath. dental stop (-ts, = -t + -s?); (12) ST -p = Ath. -'; (13–15) ST -ɒ, -n, -m = Ath. *-n;[20] (16) ST -l = Ath. -ɬ ~ -l; (17) ST -r = Southern Athapaskan zero, Mont. -r(?); (18) ST -s = Ath. -s ~ -ts(?).

20. Initials are not always fixed in Sino-Tibetan; thus Old Bodish āgel (pres.), bkal (perf.), dgal (fut.), k'ol (imperat.) *load*, intr. āk'el (pres.), k'el (perf.).[21] Old

[19] Since Ath. *-d > Mont. -r, this comparison is doubtful. It is added on the possibility that *-r dropped in Mattole and Sarsi, as 17.1–3 indicate, but was preserved in Montagnais in 17.4. Moreover there were two r's in Kukish, which I have designated r^1 and r^2, and if these existed in Sino-Tibetan, then comparison 17.4 might still be sound.

[20] See Li, Mat., p. 21, no. 18; Hoijer, SA 83, no. 26.

[21] For initial alternation in Old Bodish verbs, see my Studies in the Morphology of Bodic Verbs, Bull. Sch. Or. and Afr. St. 13. 721–724 (1950).

Bodish initials may vary within the same category:

k	k'	g		
t	t'	d		
p	p'	b		
tš	tš'	dž	š	ž
ts	ts'	dz	s	z

and we find a similar alternation of initials for the same root in other Sino-Tibetan languages. This makes the establishment of phonetic equations for initials difficult, but not impossible.

20.1. Athapaskan had only one labial which appears in most dialects as b, but in some as m, according to Li (Mat. 7) and Hoijer (SA p. 76, no. 2): Nav. SC, KA, Jic., Mesc., Lip., Chir., Mat., Wail., Kato, Chip., Mont., Hare b, Hupa, Sar. m. I shall refer to this as Ath. *b. But Hoijer noted that m appears in a few stems in Southern Athapaskan where b would be expected: Nav., SC, KA, Jic., Mesc., Lip., Chir. m, Mat. b. I shall refer to this as Ath. *m. ST *m in comparison 1.5 corresponds to Ath. *m. But ST *m before front vowels or y corresponds to Ath. *n: 3.8, 7.2, 10.3. Sino-Tibetan labial stop initials correspond to Ath. *b: 10.5, 13.4, 17.3.

20.2. TB k' seems to be represented by Ath. g: 1.8; 2.1; 4.1, 2; 11.5. If we had more comparisons we might find that ST surd aspirates are represented by Athapaskan sonants.

20.3. ST d seems to be represented by Ath. d: 1.3, 9; 3.5; 5.1; 17.1. More materials might show that Sino-Tibetan sonants correspond to Athapaskan sonants.

20.4. Ath. glotalized voiceless stop = TB voiced stop: 11.3, 4; 18.2.

20.5. ST nonaspirated surd stops correspond to the same phonemes in Athapaskan: 1.1, 2;[22] 3.4, 6.1, 8.1, 12.1,[22] 15.1.[23]

20.6. Ath. t's = ST tš: 3.3, 4.3, 11.1, 16.1.

20.7. Ath. ts = ST ts: 3.1, 10.4.

20.8. Ath. z = ST s: 3.9, 15.2, 17.2.

20.9. Ath. y = ST y: 1.6, 7.

20.10. ST n = Ath. n: 1.4, 3.6, 11, 8.2, 10.2.

20.11. Ath. l = ST l: 10.1, 13.3.

20.12. O. B. hH (easy vocalic ingress) not recorded in Athapaskan: 3.7,[24] 4.5.

20.13. Ath. x, γ correspond to an Old Bodish guttural stop: 16.2, 4.

Only a single example has been found of each of the following equations. These, however, are consistent with the above equations, i.e., they fit into the general phonetic scheme, and hence are probable: Ath. ' = ST ', 1.11; Ath. h = ST h, 3.10; ST dž = Mat. ts = Hupa dz = Wail. s, 7.1;[25] TB γ = Ath. k, 15.3;[26] K. tš' = Chip. dz, 4.4.[25]

Not all the initials of all the comparisons have been accounted for. I would not venture to set up the initial for comparison 9.1 either in Athapaskan or Sino-Tibetan at present. For some of the other comparisons the evidence is either not clear or is conflicting in one or the other family. But in a few comparisons the lack of correspondence of the initials to what we should expect by the above equations may be attributed to consonantal alternation—probbably in Sino-Tibetan.

21. Some comparisons require special consideration.

21.1. Mat. -gwo'ł *knee*, Hupa -gwot', Nav., SC -gòd, Mesc. -gòd-í, Jic. -gò', Lip. -gò, Chip. -gwór. K. *m-r-k'uk, Biate ră-k'uk; or K. *m-k'u·p, L. k'u·p. The final agrees with finals 10 or 12 above; the initials with equation 2.

21.2. Our comparisons include a considerable number for parts of the body: Ath.

[22] Aspiration or nonaspiration of initials in Old Bodish is not etymologically significant; see Studies (n. 21 above).

[23] If conclusions 2–5 and the inferences to be drawn from them prove correct, we should have "Pacifican" *k, *k', *k', *g, and similarly for the dental and labial series.

[24] Vowel diphthongized in Athapaskan.

[25] Not inconsistent with equations 6, 7, and 8 above.

[26] Not inconsistent with equation 5.

na·' *eye*,[27] Bu. myak; Ath. γwo·' *tooth*, TB *s-γwa?; Chip. γùl *windpipe, trachea*, O. B. mgul *throat;* Ath. la' *hand*, TB lak; Ath. ke·' *foot*, K. ke; Ath. ɬsał *finger*, K. *M-tšal; Ath. ɬso·' *breast*, Katšin tšu, etc.; Mat. -tse', etc., *penis*, O. B. mdže; Chip. dzù *woman's private parts*, Vayu džu-džu, K. *tš'u; and the comparison for *knee* in the preceding entry. In view of the surprisingly large number of comparisons for parts of the body, I think we may find a somewhat disguised comparison in the Athapaskan words for *nose:* Mat. -ntšxix (Mat.), Hupa -ntš^{w}iw (Hoijer), Chip. -(ń)tsį *nose*, -(ǹ)níyé *nostril* (Li), Jic. bį-tšįs *his nose*, KA bį'-tšį·š, Lip. bí-tšįš, SC bí-tšįh, Nav. bí-tšį'h, Chir., Mesc. bí-tšį (Hoijer 84). The n we find in Mat., Hupa, and Chip. and the nasalization we find in the vowels of the other languages may be the remains of a root found in Old Bodish sna *nose;* Bu. hna; K. *hna; Rawang šă-na; etc. We may suppose that the final vowel of the root has been lost in Athapaskan due to the addition of a suffix; we probably have something similar in Tibeto-Burmic in Bu., K. hna *nose*, but K. hni·t, Bu. hnatš < *hnit *to blow the nose*.[28]

21.3. Nav. -tá, -tá·^{n}' *look for* (N. Ph. 37), Chip. -tà, -tą̀, -tá, -tái' *search for* (Li). From the nasalized and nonnasalized Athapaskan forms, one may suggest that two primitively different forms may be represented: O. B. lta *look, look after or into;* O. B. mt'o*v see*, W. Him. ta*v see, look*.

21.4. Kato kwi· yi·nt pigeon (32). Bu. k'ui; Ch. 'kjạu (399). I assume that the i· of the Kato word is due to the following initial.

21.5. Kato -tše', -še' *be bad* (74). L. tš'ia, tš'e. We have no other comparisons with Lušei -ia.

21.6. Mat. ni- adjectival prefix. O. B. -n adjective suffix.

[27] The Athapaskan forms are not carefully worked out reconstructions but are intended to be merely recognizable forms to save repetition of the evidence presented above.

[28] There is a possibility that the affricates following the nasal in Athapaskan correspond to the sibilant in O. B. sna. That O. B. s- prefix sometimes came from an affricate is indicated by Sbalti (an archaic West Bodish dialect) ltsab-a *teach* in comparison with O. B. bslabs (perfect), in which b- and -s are perfect formatives. Metathesis occurred in Sbalti and the affricate was preserved.

REMARKS ON THE POLAR ESKIMO DIALECT

ERIK HOLTVED

COPENHAGEN

1. Previous
2. Recording of the Polar Eskimo dialect
3. General characteristics of the Polar Eskimo mode of speech
4. Accentuation of Polar Eskimo compared with that of West Greenlandic
5. Effects of sentence stress on Polar Eskimo
6. Remarks on phonetics
7. Remarks on morphology
8. Archaic features and possibility of influence from Baffin Island

1. Our more intimate knowledge of the West Greenland language dates back to the early times of colonization—or, more particularly, those of the mission in the 18th century. Along with the efforts of the missionaries to furnish serviceable translations of Holy Writ, the insight into the structure of the language arose, mile-stones in this work being the dictionaries and grammars of Paul Egede and Otto Fabricius[1] and, as a temporary culmination, those of Samuel Kleinschmidt.[2] In our own century above all W. Thalbitzer has devoted himself to the study of the Greenland language, with the application of modern scientific methods and points of view. To Thalbitzer we owe not only the fundamental presentment of the phonetics of the West Greenland language,[3] but also the fact that we now possess an intimate knowledge of the East Greenland dialect.[4]

The only group of Greenlanders whose language had not been thoroughly studied was that of the Polar Eskimo, whose existence was discovered as early as 1818 by John Ross, and who after the middle of the century were visited by several expeditions. Still, none of these had linguistic research on their programmes, and the Polar Eskimo words found sporadically in the accounts of the journeys are for the most part rendered in a way so as to give no firm basis for a clear understanding of the peculiarities of the dialect. No doubt the best contributions are those of A. L. Kroeber[5] and Robert Stein,[6] who evidently had an ear for phonetics; but unfortunately they mainly consist in isolated words (personal and geographical names). The same may be said of K. Birket-Smith's certainly more comprehensive and varied vocabulary.[7] The want of connected texts was severely felt.

2. The situation was still like this in 1935 when, supported by "The Commission for Scientific Research in Greenland", I arrived at Thule for a two years' stay. My main purpose was archaelogical investigations, but at the same time linguistic material was to be collected by recording tales and traditions. These were partly dictated to me by the narrators, but for the most

[1] Paul Egede, Dictionarium Grönlandico-Danico-Latinum, Hafniae, 1750; Grammatica Grönlandica Danico-Latina, Hafniae, 1760.

Otho Fabricius, Forsøg til en forbedret Grönlandsk Grammatica, København, 1791; Den grönlandske Ordbog forbedret og forøget, København, 1804.

[2] Samuel Kleinschmidt, Grammatik der grönländischen sprache mit theilweisem einschluss des Labradordialects, Berlin, 1851; Den Grönlandske Ordbog omarbejdet; edited by H. F. Jörgensen, København, 1871.

[3] W. Thalbitzer, A Phonetical Study of the Eskimo Language, Meddelelser om Grønland, Vol. XXXI, Copenhagen, 1904.

[4] W. Thalbitzer, The Ammassalik Eskimo II, Meddelelser om Grønland, Vol. XL, Copenhagen, 1923.

[5] A. L. Kroeber, The Eskimo of Smith Sound, Bulletin of the American Museum of Natural History, Vol. 12, New York, 1899.

[6] R. Stein, Geographische Nomenklatur bei den Eskimos des Smith-Sundes, Petermanns Mitteilungen, 48. Band. 1902.

[7] K. Birket-Smith, Five Hundred Eskimo Words, Report of the Fifth Thule Expedition 1921–24, Vol. III, No. 3, Copenhagen, 1928.

part recorded on gramophone discs by means of an electrical recorder. Later on, during a new stay in Thule 1946–47 the transcribed texts were revised in cooperation with the respective narrators. The texts thus prepared have been edited in the *Meddelelser om Grønland* Vol. 152.1, Copenhagen 1951.

3. In vocabulary and grammar the dialect does not deviate fundamentally from WG, but it sounds very different. The cause is primarily the peculiar rhythm of the language, secondarily the often very loose articulation. To this must be added the individual habits of speech, in connection with a very emotional mode of expression. The Polar Eskimo being quiet and self-controlled in his outward appearance, still, a strong temperament may be revealed through his speech. Finally, the single speech-sounds are subject to great variations. It can hardly be doubted that certain psychic peculiarities have in the long run left their traces on the dialect, primarily through the accentuation.

4. In colloquial West Greenlandic the speech energy is in principle rather evenly distributed on all syllables, with a tendency to lay a little extra stress on the last syllable of a word. As the last syllable belongs to the grammatical ending, this will be heard distinctly. Besides, extra force will naturally be applied to syllables with a long vowel, and when the final consonant is geminated or followed by another consonant. These retardations at irregular intervals convey an impression of a certain staggering rhythm in the speech.

In the Polar Eskimo dialect these effects produced by long vowels or consonants, of course, assert themselves correspondingly. They do not, however, dominate the general impression to the same degree, but often yield to a strong tendency to lay a heavy stress somewhere, except on the endings, if no special conditions interfere, e.g. in the transitive verb. The more lively the speech the stronger is the tendency. In many, indeed in most cases, this main stress will fall on an already stressed syllable, but certainly not in all. There is an apparent predilection for stressing the antepenultimate. The main stress will sometimes be heard in places very astonishing to a West Greenland ear. A few recorded examples will make this clear at once. Extra stress is indicated by ″ before the affected syllable; double quantity by · after the sound in question.

Polar Eskimo: uwɐr″süɑne, West Greenland: u′wɐrʃ·ua′ne *her husband*

Polar Eskimo: ig″lɔrRoAr/″iglɔRAr, West Greenland: ′i′L·ɔrʃ·u′Aq *a big house*

5. The tendency to apply emphatic sentence stress naturally affects the speech-rhythm, at the same time endangering the weaker sound-groups that lie between the tops. This has become disastrous to some grammatical endings, where only the vowel of the last syllable has had tolerable possibilities of surviving. As a rule a final stopped consonant is weakened so much that it can hardly be distinguished, or is simply lost. Only in very distinct speech the correct stops q, k, t, p will be heard. If the pace gets a little accelerated q will change into r, or sometimes into the corresponding ʁ (often further weakened into ɣ), the other stops becoming nazalized to ŋ, n, m, which, when loosely articulated, can hardly be kept apart.

If the ending contains a long vowel, ɑ· or ɔ·, just this vowel may turn out to dominate the word. It may furthermore influence whole passages which in this way are characterized by the vowel in question.

In some cases the weakening may strongly influence two connected syllables. Frequently this will take place when to the intr. part. -tɔq/-sɔq has been added the affix -suAq, which properly denotes *big, great* or the like, but in the dialect is habitually added to almost every noun not expressly denoted as -puluk, *small, insignificant*, etc. Often, it is true, -tɔq will be strongly stressed, e.g. oqɑlug′tɔrsuAr *the*

talking one, he talked, but if the stress for some reason has been laid on the preceding syllable, not much will be audible of the rest. In this case we shall get, e.g. oqa'lugt$^{\text{ɔRA(r)}}$; nereqa'tArt$^{\text{ɔrəü i(n)}}$ *they used to eat.*

6. The Polar Eskimo sound-system does not differ in its fundamental traits from the West Greenland. The vowels have the usual phonetic values of a, o/u, e/i, with their uvular variants. In addition to these, however, a sequence of variations within each group, characterized by being less strained, more rounded, or advanced, are characteristic of the dialect.

The West Greenland consonants have to be supplemented by the voiced stops, g, d, b, and h. Often a d-like variation of l is heard, and in individual cases a tongue-tip r, ð and *θ*.

Of the consonants only the voiced stops and the aspirates give occasion for especial remarks, because they display particular phonetic peculiarities which separate the Polar Eskimo dialect from others, especially the West Greenland dialect.

b occurs rarely, according to my experience. It may be heard in words like iblin *you (sing.)*; ubloq *day;* qablunA·q *white man;* also in hab$^{\text{F}}$ʃan *whales inclosed in an opening in the ice;* West Greenland savssat. These words, however, are more often pronounced i$^{\text{w}}$dlin, u$^{\text{w}}$dloq, qa$^{\text{w}}$dlunA·q, hawsan, with a tendency to make the l unvoiced L. One may also hear the assimilation fully achieved, the result thus becoming the long aspirated L· as in West Greenland.

d will hardly be heard except in connection with an l-sound. Yet in many cases it probably also here becomes unvoiced (written t) in particular after a short vowel, together with a tendency to make also the l unvoiced. This is sometimes counteracted by a tendency to linger somewhat on the d. So that we may put up a sequence of variations which all have been noticed: tikid·luγo (or maybe more exactly, tikitdluγo—sometimes sounding almost like tikikdluγo) tikitluγo/tikitLuγo/tikiL·uγo.

g often appears before a consonant as the normal, weaker variation of k, e.g., agpa, magperdLuγo, pisugtoq. As with d it may be doubted if it is really voiced in all such cases. No doubt it may so when long, e.g., a'g·uisoq *cuts meat to pieces (for the dogs)*; ag·erʃoq *is on the way.* In these cases West Greenland has the strongly aspirated x, written vg or gg. A tendency in this direction is also met with in Polar Eskimo, and thus we get varying forms, ag·erʃoq/agxerʃoq; ig·iAq/igxiAq *throat.* Finally there are the numerous cases in which g is followed by an l-sound, e.g., aglo *breathing hole;* iglo/igdlo/igLo/iL·o *house;* ig'linArtoq, igdliγa· *has an appetite for it.* Together with the above mentioned l-connections they form a group b(w)/d(t)/g(k)—dl (l/L), of which all the possible combinations may be realized. The symbols vdl, tdl, gdl, are still kept in the West Greenland written language as it was framed by Kleinschmidt, but in modern West Greenland pronunciation they have all been merged into the long aspirated L·.

In the Polar Eskimo dialect rdl/(rl/rtL/rL·) naturally joins the series as its uvular member, as against West Greenland, where it stands out as the exception, no further assimilation being practicable in this case.

As the Polar Eskimo aspirated L proves to be the result of a process of assimilation which has not yet been carried through, this sound must be rather young in the dialect. The same holds good of the aspirated labial F, which is still less developed. It is often heard as an introduction to w after r, in which case also the w is uvularized. e.g., ator$^{\text{F}}$w$^{\text{r}}$ik *occasion;* inuAr$^{\text{F}}$w$^{\text{r}}$is·uAq *place of homicide (a place name).* (To such West Greenland words as ArFeq (wr. arfeq) *whale,* or pituF·ik (wr. pitugfik) *tying place,* correspond Polar Eskimo Aqw$^{\text{r}}$eq and pitugwe; to West Greenland iwik, pl. iF·it, Polar Eskimo iwik, i$^{\text{w}}$gwin.)

Of a like variable character are the relations of x and R to their corresponding non-aspirated sounds, k/γ and q/r; e.g., one may hear nix·it *a bore, drill*, and ɛR·ɔrLuγo *washes*, but more frequently nigxin and ɛrqɔrdluγo.

However, x and R are in a peculiar way attracted by the s-sounds, the most characteristic group in the dialect. The West Greenland point-s is hardly ever heard, the corresponding Polar Eskimo sound being very loosely articulated, approaching a pure breathed h. The more rapid the speech, the less s-friction is heard. A similar blade-s can be heard in some places in West Greenland (Godthaab). It is in the written language denoted by ss. This palatal ʃ must be regarded as the normal s in Polar Eskimo, ranging from h to ʃ·.

However, the s-sound is very strongly affected by a preceding r or g. In the process of assimilation the s will usually prove the weaker part, becoming in part or totally assimilated. With a uvular sound we thus get rs > rsR > rR· > R·, with a velar sound, gs > gxs/gsx > gx· > x·, where all phases of the transition can be heard, e.g., qɑjArsuAr / qɑjAr^{ʃ}RoAr / qɑjArRoAr / ′qɑjARAr *a big kayak;* igsutin / ig^{x}ʃutin or ig^{ʃ}xutin / igxutin / ix·utin *heather* (*Cassiope tetragona*); inugʃuAq / inugxuAr / inu·x·uAr *a big man.*

With a uvular sound, R may be further weakened into h, ig′lɔrhoAr. This very often takes place in everyday speech. The transition gx > gh is also possible, (inukhuAr), but here there is a more prevalent tendency to pronounce the aspirate x.

If the s-sound is preceded by a labial, ws, the s-sound will be the dominant one as in West Greenland and cause the w to become fully or partially aspirated, or completely assimilated, e.g., iwsɔq / i^{w}Fʃɔq / i^{w}ʃ·ɔq, a faint labialization usually being retained. The extremely fine shades are difficult to distinguish, and still more, to pronounce correctly. A word such as Ivssugigsoq, (a place name: *the grassy place,*) e.g., may be rendered phonetically as ′i^{F}ʃui^{ʃ}ɔ.

Voiced s (z) is rare, if found at all. I dare not deny that it may sometimes occur in slow pronunciation of such words as ɑzuArt·ɔr, ɑzo·ulɑ *yes, indeed*, where one usually hears ʃ/h. In the instances where R. Stein has written a z, I never heard it, (e.g., inu·ʃɑ̀n *dolls*,—Stein: Inűzen; tɑ′ʃiuʃA^{r} *a lake-like fjord*, — Stein: Tasiűza).

The transition ʃ > j has taken place in the very common word tɑjɑ (from tɑ̀ʃɑ *thus, then*), but otherwise it seems to be rare.

It will appear from several examples above, that the process of assimilation so characteristic of West Greenland, is far from being so advanced, and in part takes its own course. A few more instances will show the difference:

Polar Eskimo	West Greenland	Written
imnAq *a steep cliff*	i^{w}n·Aq	ivnaq
iŋmɑ̀ŋ·uAq *a little*	im·ɑŋ·uAq	ingmánguaq
iŋnɛq *fire*	in·ɛq	ingneq
igpik *a bluff*	ip·ik	igpik
oqɑlugtɔq *the speaking one*	ɔqɑlut·ɔq	oqalugtoq
ɑwguArdLuγo *dividing it*	ax·uArLuγo	avguardlugo

Before a consonant, too, q will often be heard instead of r (i.e., not weakened as usual), e.g., oqAqtɔq / oqArtɔq *speaks;* ′AqpɑŋerLune / Arpɑ′ŋerdlune *running;* ɔqpik / ɔrpik *tree.*

The transition γ to ŋ, well known in North Greenland, is not heard in Polar Eskimo, or at least only exceptionally. The same applies to the transition u > i, common in East Greenland and both the southernmost and the northernmost parts of West Greenland (Upernavik).

The West Greenland assimilation of the vowels in ɑu and ɑe has not taken place in Polar Eskimo, both vowels being heard distinctly in such words as nɑujɑ *gull*, qɑerʃəq *rock;* West Greenland, nɑ·jɑ, qA·-rsəq. In a few cases ɑe is assimilated into e·, e.g., Polar Eskimo, -uŋne·rsəq *no longer;* West Greenland, -uŋnA·rpəq; written, -ungnaerpoq.

For West Greenland ujɑ-, iwɑ- is found, e.g., in iwɑlo *sinew thread*, West Greenland, ujɑlo; hiwɑliʃəq *boils blubber*, West Greenland, sijȧtsiʃəq, written, sujatsissoq.

Frequent contractions are iɣi > e·, ɑɣɑ > ɑ·, and Arɑ > ɑ·.

7. The use of the part. intr. forms ending in -toq / -soq in the indicative, as common in N. Alaska is prevalent to such an extent that the West Greenland -poq / -voq are hardly ever met with. The same holds good of the transitive part. forms -r/-ɣ-iɣɑ/-it/-ɑ·, etc., instead of p/w-ɑrɑ/-ɑt/-ɑ·. Dualis, characterized by the endings k/ŋ, is still in use.

8. In this short and preliminary survey I have only endeavoured to present the most conspicuous traits of the Polar Eskimo dialect. Still, as a general characterization it is possible to say that in essential phonetic respects it holds a stage which West Greenlandic has left behind, but of which traces are still preserved in the written language. It is difficult to decide now how far Polar Eskimo is indebted to the dialect of Baffin Island, through the people who immigrated in the 1860's. In all probability the influence was more apparent when R. Stein stayed in the district, and maybe in some families more than in others. The peculiar circumstances about the s-sounds point farther west, h being met with in Caribou and Copper E, the uvularized ʃ in N. Alaska, and as the cultural history of the Thule district in general seems to be rather complicated, there may be some reason to assume that the same holds good of the development of the language.

UNAALIQ AND PROTO ESKIMO II: PHONEMES AND MORPHOPHONEMES*

MORRIS SWADESH
NEW YORK

2. Phonetics
2.1. Unaaliq phonemes
2.2. Vowel positions
2.3. Consonant positions
2.4. Other Yupik dialects
2.5. Inupik dialects
3. Morphologic phonology
3.1. Principal morpho-phonemes
3.2. Morpheme shape
3.3. Consonant changes
3.4. Vowel contractions

2. Our material on Unaaliq provides the basis for a fairly complete account of the phonetics. The list of phonemes and their general phonetic delimitation is probably complete and adequate for ordinary purposes. The main facts about phoneme sequences seem to have been discovered, but the enumeration of actually occurring consonant clusters is necessarily defective, especially for three-consonant groups. For Yupik dialects other than Unaaliq and for the Inupik dialects, the observations presented here cover only the more striking facts necessary for the phonemic interpretation of the source material.

2.1. The phonemes of Unaaliq include three vowels and eighteen normal consonants, as follows: i a u, p f v m c s j t ɬ l n k x γ ŋ q χ ʀ. A restricted consonant, r, occurs only between vowels in a few special words.

The continuant consonants and the vowels show the greatest amount of conditioned phonetic variation. Thus v and j have vocalic timbres (like English w and y) when flanked only by vowels, that is at the beginning of words and between vowels within the word, for example: vik *grass*, cavik *knife*, javun *oar*, qayaq *kayak*. In consonant clusters, including the geminates (vv jj), v is a bilabial spirant (like Spanish intervocalic b, similar to English v) and j is a voiced sibilant (like English z): navʀiituq *lends*, qaŋvaq *when*, kavviaq *fox*, qajvaun *ladle*, qujŋiq *reindeer*, pamjuq *tail*, kajjiuq *is strong*.

The vowel i varies between high and mid and between front and central. The highest timbre (like English machine) is found in the vowel groups ii iu ui ai except that a following velar consonant results in an open quality of ii and of the the second element of ui ai. The i of ia also has an open quality. A single i is typically high open (like English hit), somewhat lower in contact with a velar. It has a front or central timbre depending on the adjoining consonants, in that s j c keep it fronted and other consonants in varying degrees veer it toward central. The vowel u has high back close rounded timbre (as in Lulu) in the groups uu ui iu au, except for lowering before velar consonants. The u of ua also has an open timbre. A single u is typically high open rounded (like English put), but is lowered still further in contact with velar consonants. The vowel a is low back unrounded, but may be slightly fronted in contact with j s c and in the groups ia ai.

Positions of consonantal articulation are as follows: bilabial p f v m, post dental or alveolar t ɬ l n r, front palatal k x γ ŋ, velar q χ ʀ. Before vowels p t k q are lightly aspirated, and they are fully aspirated at the end of words or before non-identical consonants; they are unreleased when occurring as the first of a geminate pair, e.g. ittuq *is deep*. The c is a sibilant affricate, more or less like English *ch*; an s-timbre enters into the release of c when it occurs before conso-

* The first paper in this series is already published as part of the 1951 Centennial volume under the title, Kleinschmidt Centennial III: Unaaliq and Proto Eskimo, IJAL 17.66–70.

nants, as in ctaamat *four* or kicłuki *counting them*. The s is normally sibilant (like English s) but has a bit of sh-timbre, especially before i and most of all in a geminate cluster before i, as assiituq *is bad*. The single tap liquid r is not a normal phoneme of Unaaliq, since it has been found only in the exclamation arɪʁaa *pretty! good!* and in the borrowed words piruufkaq or miruufkaq *rope* from Russian vjirófka and taaktiraq *doctor* from English. However, in most borrowings original tapped r is replaced by l, as caaxalaq *sugar* from Russian sáxar or lumaaxaq *shirt* from rubáxa.

All consonants, and most notably the voiced continuants v j l ɣ ʁ, are articulated more strongly and are long when occurring as the first consonant in a cluster, for example malʁuk *two*, and in geminate groups, as nulliaq *wife*.

Nasals are partly unvoiced when occurring in contact with a voiceless consonant in the same word, as kitŋik *heel*.

Accent is non-distinctive. Some mechanical differences of accentuation are conditioned by the phonetic structure of the syllables and their position in the word. Closed syllables are generally pronounced with more emphasis than open, those with two vowels stronger than single-vowel syllables. The second last syllable tends to receive the chief word accent unless it is a single-vowel open syllable preceded by a stronger syllable. The syllable accent in a two-vowel syllable falls on the first vowel in all groups except ia and ua of medial syllables, in which cases more time and greater emphasis are given to the second vowel. In either the first or last syllables of the word, the first elements of ia and ua are emphasized, in the same way as other vowel clusters.

2.2. Vowels occur singly and in clusters of two. Every possible two-element combination of the three vowel phonemes has been found, both geminates and mixed groups. Single vowels and vowel groups occur initially and finally as well as medially. However, groups like ia ua iu ui, that is with high vowels preceding non-identical second vowels, evidently do not occur. There seem to be no limitations of vowels by reference to adjacent consonants, except that among vowel-consonant-vowel sequences uvu uvi ivu iji ija do not occur.

In our material we find no instances of vowel clusters containing more than two elements; uaa iaa and aai were recorded but it is likely that these represent non-distinctive variations of the phoneme groups ua ia and ai. In Hinz' Kuskokwim we find instances of iai uai iaa uaa in certain paradigmatic combinations where ai aa of a suffix follows i or u of the root. Since we did not happen to record comparable paradigmatic forms, we cannot affirm or deny the existence of such sequences in Unaaliq. However, unless there is error in Hinz' record, it is likely that these clusters do exist in both dialects.

2.3. Consonants are considerably limited in their occurrence and combinations, but not nearly as much as in the Inupik dialects.

In word final, there is never more than a single consonant, which may be any nasal, m n ŋ, or a non-labial stop, t k q. Some of these finals are narrowly limited in their morphologic functions. Final m occurs only as the ending of the superordinate case, ŋ as the vocative ending of relationship terms and in the third person singular of the conjunct and subjunctive modes, t only as the plural ending and as the superordinate second person possessive. Final n k q are common, occurring both in stems and in paradigmatic endings.

Consonants in word-initial predominantly follow the familiar limitations of Greenlandic (and Inupik), except that c takes the role of s. The common initial consonants therefore are m n p t c k q. But in addition there are also instances of initial consonants and clusters that agree with permitted medials. The following have been found: l ɣ j v x χ ɣɣ ɣl nn ɬ st ct cɬ txx pχχ kxx kxɬ kxs. Of these, st occurs only in the borrowed word stuuluq *table* from Russian stol.

In medial position are found all single

consonants, all geminates except that tc takes the place of double c, and a large proportion of all other possible permutations of two consonants. Systematically excluded are combinations of stops or spirants with continuants,[1] in either order. Spirants are common before stops; nineteen of the twenty five possible permutations have already been found, lacking only fp sp sc χk fq xq. Stops before spirants are common, with the following fifteen already observed: pɬ ps pχ tf tx tχ cɬ cx kɬ ks kx kχ qf qɬ qs. Non-identical clusters of stop plus stop or spirant plus spirant are not common, being so far exemplified only by pt ct qp qc qt tq and xf χɬ χs ɬχ. Thus, the pattern of joining stop with spirant is far more prominent than that of combining those of like type, but the latter is not absent. By contrast with the stops and spirants, the pattern of joining consonants of like type is frequent for nasals and continuants. Of mixed nasal groups we find so far five of the six possible permutations, namely mn mŋ nŋ ŋm ŋn, with only nm lacking. Of mixed continuant groups we have so far fifteen out of twenty five possible: vl vj vʏ vʀ lʏ lʀ jv jl jʏ jʀ ʏl ʏj ʀv ʀl ʀj. Eight out of fifteen possible continuant-nasal groups have been found: ʏn lŋ jŋ ʏm ʏn ʀm ʀn ʀŋ. The opposite order, that is nasal-continuant, is also well represented, with ten of the fifteen possible: ml mj mʏ mʀ nv nʀ ŋv ŋj ŋl ŋʀ. Nasal-stop shows eight of the fifteen possibilities: mt nt nk nq ŋp ŋt ŋc ŋq. For nasal-spirant we have recorded only two of fifteen, namely mɬ ŋχ (amɬiq *many*, taŋχaa *sees it*). Of stop plus nasal are noted tm tn kŋ qn, of spirant plus nasal only ɬŋ (afciɬŋaq *rat*).

Clusters of three consonants, while much less frequent than those of two, are nonetheless very definitely represented. Two instances of fourfold groups have been found, but the language doubtless has a fair number, and it is even possible that clusters of five or more occur. There are evidently three limitations. First, continuants do not occur in multi-consonantal clusters of above two elements. Second, nasals may occur at the beginning or end of a cluster but never between consonants. Third, geminate pairs may occur in a multi-consonantal group only if they are spirant and come last in the sequence (e.g. kxxaa *biles it*). Our two observed four-element clusters are in taŋχctaaq *show* and qimuxtxka *my two dogs*; the paradigm of *dog* should also contain the form qimuxtxput *our two dogs*, but this word was not actually obtained. Some examples of three-consonant groups are: taɬxaq *crane*, pikχtun *whip*, utχtua *I return*, taŋχtuq *sees*, kxɬuk *let's both bite*, kxxamtxu *when we bite him*, qimuxtfut *our dog*, txxuq *is hard*, micixcki *let them jump*. It is interesting to note that many of the examples result from the addition of paradigmatic endings.

Geminate consonants are very common following the first vowel of a word, as in attauciq *one*, unnuaq *this morning*, kajjiuq *is strong*, mikkuq *is small*, panniit *daughters*. There are also cases in initial position, as nna *house*, ʏʏaaqa *I cook it*, ɬiiʀuq *bets*. Evidently geminates in initial position are limited to nasals, continuants, and spirants, while geminate stops evidently do not occur in initial position. Geminate spirants may also occur at the end of initial triconsonantal clusters, as in kxxaa, txxuq, already cited. Very typically, the geminate consonant is followed by a vocalic group, either mixed (e.g. attauciq) or geminate (e.g. ʏʏaaqa), but instances also occur before a single vowel (e.g. txxuq). Double consonants in positions subsequent to that following the first vowel of the word are infrequent in our material. We have cikkavviaq *hawk*, piχpakkaa *love*, and some cases of kk in paradigmatic endings of the verb, in which our kk corresponds to tk in Hinz' Kuskokwim. Even though our record is not fully reliable in distinguishing single and double consonants, it is clear that

[1] For ease of reference, we use "spirant" to refer to the strongly articulated invariably voiceless fricatives, and "continuant" for the contrasting weakly articulated characteristically voiced fricatives.

geminates are found mostly in the positions before and after the first vowel of the word.

While single consonants are in general very frequent, this does not hold true of the voiceless spirants s x χ. Spirant ɬ is reasonably frequent, but s x χ occur mainly in mixed clusters. Single s has been found only in pisaɴʀitī- *to mean no harm*, asik- *good*, pisuq- *hunt*, and qusik- *high*; single x in native words only in aixaq *finger*, uqiixitī- *light*, akkiimaŋaaxuq *wins*, but quite typically in words borrowed from Russian, as lumaaxaq *shirt* from rubáxa; χ in piciiχuq *does*, uqnaχuq *is hot*. No single f has yet been found. Geminate voiceless spirants, except ɬɬ, are also rare; they have been observed in assiitī- *bad*, massiuq *mashes*, kassuutī- *marry*, cuxxaq *beak*, kuffiaq *coffee* borrowed from Russian.

2.3. Unaaliq is identical with Nunivak and Kuskokwim in its phonemic pattern and agrees almost completely with these dialects even in phoneme distribution and details of positional variation. Thus, in phonetics as well as in other respects, it is clear that we are dealing with sub-varieties of a single Yupik dialect.

Nunivak differs from Unaaliq and Kuskokwim in using x and χ in word-final position in place of k and q. The occurrence of consonant clusters beginning in c is a peculiarity of Unaaliq, since Kuskokwim-Nunivak staamat corresponds to Unaaliq ctaamat *four*, K ɬa and N sɬa correspond to U cɬa *weather*. The positional variants of j are evidently somewhat different in each of the three-subdialects. The palatal value (like English y) seems more usual in Nunivak and Kuskokwim than in Unaaliq. The sibilant value (z), so common in Unaaliq, in Kuskokwim seems to occur mainly in the sequence uji.

Siberia Eskimo phonetics have much in common with Unaaliq-Nunivak-Kuskokwim, but also have marked special features. Some of the peculiarities veer in the direction of Inupik. As in the latter, there are rather few geminate vowels in Siberia Eskimo. And like Inupik, Siberia has s and no c as a phoneme. However, in its stock of phonemes and in their positions of occurrence, Siberian otherwise largely agrees with Alaskan Yupik. A significant difference of phonetic detail is that Siberia Eskimo has no sibilant value (z) for its j phoneme.

Certain evidence in the available data seems to point to the existence in some of the local varieties of Siberia Eskimo of a special phoneme, a voiceless spirant of j-timbre similar to the fronted palatal spirant of Standard German ich. This possibility is important historically, because the comparative evidence of the two Yupik dialects and of Eskimo generally forces the inference that just such a phoneme must have existed in proto Yupik. That is, in addition to the prototype of Siberian s and Alaskan c, proto Yupik must have had a separate voiceless spirant of the j-series. For the sake of convenience, we shall use the symbol ʃ to represent this phoneme.

There is no sign of an independent ʃ-phoneme in Xwaŋkuta Ihaput or in Rasmussen. Bogoraz recognizes several sibilant sounds, including voiceless (s), voiced (z), affricate (c), palatalized (ṣ), but he specifically states (p. 109) that they 'represent the same variable sound', in other words, that they are phonetic variants of the s-phoneme. If our inference is correct that some of the subdialects actually have two phonemes here, then it is also likely that Bogoraz, who worked with various informants from different places, would have heard both kinds of subdialect. However, it is also possible that he may have early noticed variation in the s-phoneme and thereby become convinced that all s-like sounds were essentially one. Once having made this assumption, he could easily have missed a dialectal phonemic contrast within the general range.

It is in Jenness that we find evidence for a phonemic contrast between a sibilant and a prepalatal spirant. Corresponding to Unaaliq c, Jenness' Siberian forms have s or ʃ, e.g. savik *knife*, ʃavək *sealing harpoon*,

which are evidently different writings and translations of the same native word. We also find s in consonant clusters, as stamat *four*; another example is what Jenness writes situk *finger-nail*, but which must be stuk, since Bogoraz writes əştu- (p. 127); and still another example may be sła *weather*, even though Jenness writes siła. By contrast with these cases we find the following writings in Siberia words whose Alaska Yupik cognates have s: naixquq corresponding to Unaaliq-Kuskokwim nasquq *head*, ukjuʀ- corresponding to Xwaŋkuta uxsu- and UNK uksuʀ- *winter, year*; apjuq or apʃuq for U apsuq, N apsuχ *smoke*; aqʟiaʀquq for N aqsaχquq *stomach*. The last form is probably due to a misreading of aqxia- in the manuscript, since the lateral affricate which Jenness (see p. 5) represents by ʟ would hardly have crept into a root which originally had j. In view of what we know of the occurrence of sounds in Yupik generally and in Siberia Yupik in particular, it is safe to assume that any consonant in direct contact with a stop must be voiceless. Furthermore, the comparative evidence indicates that the sounds written with x preceded or followed by the front vowel i in naixquq and aqxiaʀquq must be phonemically identical with the voiceless j of apjuq and ukjuʀ-. Using the letter ʃ for this phoneme, then the forms we have examined are phonemically naʃquq, ukʃuʀ-, apʃuq, aqʃaχquq.

However, our use of the letter ʃ for a voiceless spirant of the j-series must not be confused with Jenness' employment of the same letter for a sound or a range of sounds 'midway between English s and sh . . . , inclining now to one, now to the other . . .' (p. 5). For Jenness ʃ was something rather close to s and therefore probably would not have been used for something of the nature of a voiceless j. Consequently his alternate writings of apʃuq and apjuq may very well represent contrasting sub-dialectal forms, the first of which we would represent apsuq and which must be the kind of pronunciation which Bogoraz and Rasmussen reflect. The basis for such an interpretation is found in Jenness' description of his informants (p. 3): 'The East Cape words came from two different Eskimos, one at Wales, the other at Little Diomede island, both transient visitors in those places, and both claiming to have come from East Cape; but they seem to have lived in different, if neighbouring, villages, because their words sometimes show slight variations.'

2.5. The Inupik dialects lack the general contrast between voiced continuants and voiceless spirants. In many respects s may be classified with the stops p t k q in what may be designated for convenience the strong series, as against the weak continuants v j l γ ʀ. The latter series is most typically voiced but may be voiceless in given positions, particularly in contact with consonants of the strong series. None of the Inupik dialects has ɬ as a separate phoneme, although devoiced variants of l occur. In Jenness' record of Wales ɬl and occasionally lɬ are found, evidently as free phonetic variations of ll.

Wales has a z-phoneme, belonging to the weak series. Greenland, in one or two of its sub-dialects, has a ʒ-phoneme, but this is absent in most of the local dialects of Greenland.

Some of the Inupik dialects, particularly Wales and Greenland, have sequences of three or more vowels; in Greenland as many as five occasionally occur. Consonant groups are strictly limited to medial position only, and never have more than two members. Generally speaking all geminates occur, but Wales seems to have limitations with reference to the strong series. Of mixed groups, Wales, Barrow and Mackenzie have strong-strong (e.g. qt), weak-weak (e.g. lʀ), weak-nasal (e.g. ʀn), nasal-nasal (ŋm). Greenland departs from the general pattern by having weak-strong (e.g. ʀt) in place of strong-strong, except that it admits ts. Greenland also has tl, but does not allow l as the first element of clusters. Final consonants are t k q m n ŋ in Barrow, Wales, and Macken-

zie. Kleinschmidt's dialect of Greenlandic has p t k in place of final m n ŋ, but Thalbitzer reports Greenlandic dialects with only nasals in final position. Initial consonants for all the Inupik dialects are p t k q m n s. However, Barrow and Wales also have a limited occurrence of initial l in the names of some birds.

A few peculiar phonetic details need to be understood in order to properly interpret the materials. Some sub-dialects of Coronation have x̣ or h in place of sibilant quality for s. The j varies toward sibilant quality, usually voiced but also sometimes partly devoiced, in Mackenzie and Coronation. In the combination iji in Wales and Barrow, the continuant takes on the quality of a fronted anterior palatal voiced spirant. Also in Wales and Barrow, ʀ after a consonant may have a partly sibilant inception. In Wales an i becomes rounded (ü) by the influence of an immediately following labial consonant or of an u following either immediately or with an intervening consonant. The sequence iu is written by Jenness as üu or sometimes even üyu. Wales gives a rounded and raised quality (ö) to a under the influence of an i in the next syllable. In Barrow palatal timbre is carried into a following syllable from i over an intervening dental consonant, e.g. silin *whetstone*, pronounced siljin. There are sporadic indications of rounding induced by u under similar conditions.

A noteworthy phonetic detail of Inupik, in contrast to Yupik, is that i is always of front timbre.

3. Suffixation, the sole morphologic technique of Eskimo, brings the initial of suffixes into contact with the final of stems or of other suffixes coming immediately before in the complex. Certain phonologic adjustments are made between the phonemes thus brought into contact. There are also changes which respond directly or indirectly to the form of syllables and their location in the word. Our limited material enables us to give a preliminary partial account of the formational phonology. In some points we are able to supplement our study by reference to Kuskokwim forms (labeled K).

3.1. Where the same meaningful element appears in different forms in combination with other morphemes, it is usually possible to explain the variations by regular rules of interchange applied to a single basic form. Sometimes two or three alternate basic forms have to be recognized.

Where the differing forms of a morpheme show interchanging ɣ-x-k, ʀ-χ-q, v-f-p, l-ɬ, j-s-c, the variation is best understood by assuming the voiced continuant as the basic morpho-phoneme, therefore ɣ ʀ v l j respectively in the sequences mentioned. Such interchanges may be illustrated by the suffix -vut *our* in acaavut *our aunt*, qimuxtfut *our dog*, acaxput *our aunts*, qimuxtput *our dogs*. The rule of interchange here illustrated is v after vowel, f after stop, p when combined with the t ending of the plural. However, the phonology of continuants involves some further complications and we shall have to return to the matter farther along.

Other consonantal interchanges are t-n and t-s. In both these cases we take t as the basic morpho-phoneme, but it is necessary to distinguish between t of the plural ending, t in nouns and t in verbs. Plural t contracts with v of possessive endings to give p, as already illustrated, and changes to n before -ka, the first person singular possessive, e.g. atciit *aunts*, atciinka *my aunts*. In noun forms t changes to n when it comes to stand in final position but is otherwise t, e.g. aŋun *man*, K aŋutka *my man*, plural aŋutit. In verbal forms, since there is always a suffix, we cannot speak of the development in final position, but have to recognize a change to s before k of the subjunctive mode sign, e.g. kiɣmauskumta *that we bite each other*.

The main vocalic interchanges can be understood by recognizing a special variable vowel, which appears as a in final position and before i of a following suffix, which takes the form of i in certain protected non-final

positions, and which drops out completely in many non-final positions. The variable vowel may be illustrated with qimuxta *dog*, qimuxtai *their dogs*, qimuxtimni *on my dog*, qimuxtfut *our dog*. To illustrate the difference between the variable and invariable a, compare tuma *road*, tumit *roads*, with nuna *land*, nunat *lands*. As a symbol of the variable vowel we use i with two dots, e.g. tumï- *road*; to indicate that the a in a specific form is based on the variable vowel we place the two dots over a, e.g. tumä *road*. However, the i or a representing the variable morpho-phoneme are not pronounced differently from other instances of i and a.

The variable vowel is preserved as i before a word-final consonant, e.g. atiq *name*, contrasting with atχit *names*, from atïʀ-. It is also retained as i within consonant sequences which do not occur as clusters. Thus it intervenes to prevent multiconsonantal clusters containing an n between consonants or two continuants clustered with n, for example qimuxtinka *my dogs* but qimuxtput *our dogs* (from qimuxtï-t-vut), or aʀvinilγit *six* (plural), aʀvinliγni *in six*, from aʀvinïlïγ-. A word-initial ï is lost if it is not the only vowel of the non-paradigmatic portion of the word, e.g. ʀuuʀaqa *I wash it*, but iʀʀuq *washes*; contrast fixed initial i in itχatuq *is shallow*, ittuq *is deep*, from itï-.

Although the variable vowel is usually preserved as a in word-final, this does not apply to the position after a postvocalic t. In this position, ï is lost, the t changes to n, and any double vowel before the consonant is reduced to a simple vowel, e.g. javuutit *harpoons*, but javun *harpoon*, from javuutï-.

Other than the morpho-phonemes treated above, the remaining ones correspond fairly well with the ordinary phonemes of the language. That is, for the most part there is no variation. Such contractions and special combinations as take place are best treated after we have examined the characteristic shapes taken by morphemes.

3.2. Aside from certain paradigmatic suffixes and a few dependent nouns, morphemes (stems and suffixes) may end in a vowel or in a two-vowel cluster or in one of the two continuant morpho-phonemes γ ʀ. A final single vowel may be the variable ï or invariable i a u. Final vowel groups include geminate and two-element mixed groups composed of the vowels i a u; groups involving the variable ï do not figure in the theory of finals. The paradigmatic elements whose finals differ from the limitations set forth here include superordinate -ïm, plural -ït, second person superordinate -vit, kinship vocative -aŋ, conjunctive-subjunctive third plural -iŋ; in other words they have final m ŋ or t. A few dependent noun stems, never used without possessive suffixes, end in ŋ, e.g. qaiŋ- *top* as in qaiŋa *its top*.

Verbal roots and verb-forming suffixes ordinarily do not appear without other morphemes following them. Noun roots and noun-forming suffixes and of course paradigmatic endings may appear in word-final. In this position, the morpho-phonemes γ and ʀ take the phonemic form of k and q; thus, the dual is -ïγ- as shown by forms like javuutiγni *on the two harpoons*, and with devoicing in javuutxka *my two harpoons*, but the morpheme final γ is represented by k in word final javuutik *two harpoons*. Similarly, the common noun-final ʀ appears as such in forms like kinʀit *matches* from kinïʀ-, or atiʀmik *by name* from atïʀ-, and as devoiced in atχit *names*, but as q in word final kiniq *match*, atiq *name*. Morpheme final ï is generally preserved as a in word-final, e.g. tuma *road*, tumit *roads*, or qimuxta *dog*, qimuxtit *dogs*, but in one position, following post-vocalic t, it is dropped; the t is then represented by n and any double vowel preceding it is simplified, e.g. javun *harpoon* as compared with javuutit *harpoons*.

In citing morphemes in the grammatical discussion and in the vocabulary, it is often convenient to give them in their word-final form. The dots over ï may be retained, and dots placed over a final a (that is ä) where it represents the variable vowel; however, it is understood that the pronunciation is not

different from other instances of i or a. Final q k n in such forms represents morphophonemic ʀ γ tī. Thus, we can write tumä, atīq, acak, γan for tumī- *road*, atīʀ- *name*, acaγ- *aunt*, γatī- or īγatī- *pot*.

Most suffixes begin in a single consonant, which may be ɬ or any stop, nasal or continuant; voiceless spirants other than ɬ do not occur as the basic morpho-phonemic initial. A few suffixes begin in short i, a or u. Several suffixes begin in morpho-phonemic I, which of course is lost in many positions. To assume an initial ī rather than a consonant initial, there must be at least one type of combination that cannot be explained by the simpler alternate assumption. Certain suffixes are conveniently listed as having a biconsonantic initial, e.g. -nʀitī- *not*, but these may also be thought of as having an intervening variable vowel; in the case cited, for example, we can even analyze the suffix into two parts -nīʀ- abstract noun formative and -itī- *to be without*, so that a word like minʀituq *is sober* involves miniq (minīʀ-) *drinking* and etymologically means *is without drinking*. Another kind of apparent two-consonant initial is that illustrated by -χ-paq *large*, which has the form of -paq after ʀ or γ, e.g. manixpaq *large egg* from maniγ-, but has the form -χpaq after a vowel final, e.g. tuntuχpaq *horse* from tuntu *caribou*. However, it should be noted that ʀ is so common as a noun final as to have practically an independent morphologic function. Therefore, the χ of the suffix in question may be regarded as the devoiced form of an ʀ added to the noun stem.

Suffixes fall into two phonologic classes with regard to their effect on a preceding morpheme-final consonant (ʀ or γ). An eliding class is added to the prior element minus its final consonant, e.g. junʀaq *child* from juγ- *person* plus eliding -nʀaʀ- *small*. The neutral class allows the final to remain, as in manixpaq *large egg*, formed from maniγ-. Some elements, particularly paradigmatic elements, cause elision or not according to the specific form of the preceding morpheme.

Although the different forms in which a suffix appears are for the most part explicable by the application of automatic and consistent rules to a single basic form, some alternations can be explained only by assuming more than one basic form. Thus the agent suffix is -tī- after consonants, -stī- after vowels, e.g. qimuxta *puller* or *dog* from qimuγ-, niʀista *eater* or *louse* from niʀi-, γasta *cook* from γa-.

3.3. When consonants are brought into contact with each other by the loss of intervening ī, they undergo a minimum of phonetic modification. Continuants are devoiced in contact with stops, e.g. atχit *names* from atīʀ-īt, javuutfut *our harpoon* from javuutī-vut. The sequences t-v and t-j are contracted to p and c respectively, e.g. tikiipailimta *after we arrive* from tikiitī-vailajamta, tikiicamta *when we arrive* from tikiitī-jamta.

When morpheme final γ or ʀ come into contact with a directly following consonant, that is with no intervening ī in the basic forms, the devoicing of γ or ʀ before stop (or spirant ɬ) takes place in the regular manner, e.g. miχtuq *drinks* from miʀ-tuq, compare Kuskokwim miʀun *drinking cup*. However, in addition, spirantization also takes place on direct contact of γ ʀ with a following continuant, and one of the two consonants entering into the cluster is changed into a stop. Thus, γ ʀ become stops before j and the latter becomes s, as miqsuxtuq *is thirsty* from miʀ-juγ-tuq. With the other continuants, it is the second element which changes to a stop, e.g. kxxaχput *we bite him*.

There is possibly one kind of continuant combination that is not devoiced, namely γ or ʀ followed by l, as miciγluk *let's both jump* (dual). However, the suffix here may begin with ī, as suggested by micxiłta *let's jump* (plural) perhaps from micīγ-īlīta. If we do not recognize initial ī in such suffixes,

it would become necessary to postulate a process of vowel insertion to break up certain consonant clusters. Without a larger representative body of data, showing all the various morpho-phonemic permutations, it is impossible to determine which is the more satisfactory formulation to account for all the phenomena.

One consonant change is caused not by grouping of consonants but by their collocation with reference to vowels. Except for v or j at the phonemic initial of the word, whenever a consonant located after the first morpho-phonemic vowel of the word comes to be followed by a morpho-phonemic vowel group, the consonant is doubled. In this process tc appears as the gemination of c. The vowel group that brings forth the doubling may result from adding a suffix-initial vowel to a final vowel of a root stem or from a contraction of two vowels over an intervening consonant. Groups like ĭa ĭu actually end up as a short vowel but their effect on a preceding consonant is still that of a vowel group. Examples are: kummauq *burns* from kuma-uq (cp. N kuman *lamp*), canniani *near it* from cani-a-ni, ɣɣaaqa *I cook it* from ĭɣa-aqa, kxxaa *bites it* from kĭɣĭ-aa, cavviit *knives* from caviɣ-ĭt, atciit *aunts* from acaɣ-ĭt, ajjiimta *when we go* from ajaɣ-amta, attii *his father* perhaps from ata-ja, ittuq is *deep* from itĭ-uq, kxxuq *bites* from kĭɣĭ-uq. An example showing that the doubling does not apply to j in phonemic initial is juut *people* from juɣ-it perhaps basically ĭjuɣ-it. No clear instance with v can be cited, but presumably such cases would follow the same pattern as those with j.

One available example indicates that doubling also occurs before a word-final single vowel. Thus nna *house*, nit *houses* from ĭnĭ-.

3.4. Where the process of suffixation brings two fixed vowels into contact, the result is a simple cluster of the two vowels. Where the variable vowel ĭ is followed by a fixed vowel (i a u), the result is a simple vowel qualitatively identical with the fixed vowel except that under the appropriate circumstances it causes the doubling of a preceding consonant in the same way as vowel groups, e.g. mikkuq *is small* from mikĭ-uq, kxxaqa *I bite it* from kĭɣĭ-aqa. If a fixed vowel is followed directly by a variable vowel, the effect is as though there were no second vowel at all, e.g. nunat *lands* from nuna-ĭt. If two variable vowels come together, the result is a variable vowel subject to loss in the same way as all other instances of the variable vowel, e.g. qimuxtik *a couple of dogs* (dual), qimuxtxka *my two dogs* from qimuxtĭ-ĭɣ- and qimuxtĭ-ĭɣ-ka. Thus, in sum, all effect of a morpheme-initial ĭ disappears when it follows any vowel (a i u ĭ).

In certain sequences of vowel-consonant-vowel, the intervocalic consonant is lost with or without modification of the resulting vowel group. The sequences aja, ija, aɣa, aɣi, iɣi, if produced by the process of suffixation, all contract to ii. Examples are K aɣiin *when he hangs* from aɣa-jan or aɣa-ɣan, attii *his father* evidently from ata-ja with -ja as a variant of -a of third person, ajjiimta *when we go*, from ajaɣ-amta, atciit *aunts* from acaɣ-ĭt, aŋŋiit *paternal uncles* from aŋaɣ-ĭt, ammiit *doors* from amiɣ-it. Third person possessives of nouns ending in ĭ also produce ii as a contraction product, e.g. javuutii *his harpoon*; this can only be explained by postulating -aja as a variant of the third person ending, so that javuutii would be from javuutĭ-aja. As we know from other formations, ĭ would be lost before either -a or -ja.

Contraction of uɣĭ to uu is illustrated in juut *people* from juɣ-ĭt. Contraction of ɪʁĭ to ii is seen in najjiit *seals* from najɪʁ-ĭt, but in other comparable cases a variant form of the same suffix is used, as amit *skins* from ami(ʁ)-ĭt, that is the suffix is used with eliding effect on the preceding consonant. Because of variant forms of the suffixes and our limited material, it is difficult to formu-

late a full and adequate theory of contraction for vowel-consonant-vowel sequences.

In the possessive paradigm of bi-syllabic nouns and some other formations, doubling of the vowel of the second syllable takes place under certain rhythmic circumstances. For example, the paradigm of acak *aunt* has lengthened second vowel in acaaka *my aunt*, acaavut *our aunt*, acaaci *your aunt*, acaatik *the aunt of you two* (dual). The condition is that the formation be tri-syllabic or longer and that the first two syllables be morphophonologically open. The consonant before the doubled vowel is not geminated, in contradistinction to the treatment before a vowel group resulting from contraction.

ZOQUE V: OTHER STEM AND WORD CLASSES

WILLIAM L. WONDERLY
SUMMER INSTITUTE OF LINGUISTICS

8. Attributives
9. Intensives
10. Pronouns
11. Demonstratives
12. Numerals
13. Participles
14. Particles

8.0. Morphological sequences which characterize attributive stems are summarized in **4.2** and shown in detail in **8.5.** Analysis of attributive stems is given in **8.1–8.4.** Attributive stems (designated At) constitute a minor stem class related to, but different from, noun stems (N); attributives (designated Atr) constitute a minor word class related to, but different from, nouns (Nn).

8.1. Attributive stems may consist of one morpheme (At^1), two morphemes (At^2), or three morphemes (At^3).

8.1.1. Attributive stems consisting of one morpheme (At^1) may be monosyllabic, dissyllabic, or polysyllabic.

Monosyllabic At^1 stems have the form CVC or CVCC. Examples show stems with form CVC ending in y: kay *narrow*, pʌy *long*. Other examples show stems with form CVCC ending in a cluster ʔc, ks, hk: tʌʔc *dry*, čiks *little*, yʌhk(-) *black*.

Dissyllabic At^1 stems may end in a vowel in the form CVCV, CVCCV, or CCVCV. Examples are: home *new*, huyu *round*, popo *white*, kacu *sour*, malo *bad*, suñi *pretty*, pʌʔa *humid*, ʔoye *good*; hoʔma *gray*, cimbu *short*, saʔsa *beautiful*; klaru *clear*.

Dissyllabic At^1 stems may also end in a consonant in the form CVCVC or CVCCVC. Examples show stems ending in c, h, y, n, ŋ: hemec *heavy*, hʌnʌh *light* or *quick*, ponih *slow*, takay *bitter*, cikin *spotted*, ʔušaŋ *little*; cuhcuh *green*, mʌškuy *ugly*.

Dissyllabic At^1 stems may also end in a cluster of two consonants in the form CVCVCC. Examples show stems ending in clusters ks, yh, hc, hs: čʌlʌks *little*, čokoyh *slowly*, panahc(-) *slippery*, capahs(-) *red*.

Polysyllabic At^1 stems (three syllables or more) include mostly loan words. Examples: ʔonrado *honest*, moderno *modern*.

8.1.2. Attributive stems consisting of two morphemes (At^2) are of various types. Examples are shown here.

Stems in which 50–70 + At^1 or N^1 = At^2: ʔaʔŋuma *tongue-tied* (ʔaŋ- = 51; ʔuma *dumb* = At^1); koʔsawa *crazy* (koʔ- = 52; sawa *air* = N^1); niʔoye *pretty good* (ni- = 61; ʔoye *good* = At^1); saŋyaci *very bad* (saŋ- = 71; yaci *bad* = At^1).

Stems in which V^1 + 300 = At^2: sose *cooked* (sohs- *to cook* = V^1; -e = 314).

Stems in which At^1 + At^1 = At^2: yawapuʔcʌ *rose-colored* (yawa *tender* = At^1; puʔcʌ *yellow* = At^1).

Stems in which At^1 reduplicated = At^2: ponihponih *very slowly* (ponih *slowly* = At^1).

8.1.3. Attributive stems consisting of three morphemes (At^3) are of various types. Examples are shown here.

Stems in which 70 + At^2 = At^3: saŋdome *very near* (saŋ- = 71; tome *near* = At^2).

Stems in which N^2 + 300 = At^3: naʔčaŋ *frightful* (naʔci *fear* = N^2; -ʔaŋ = 313).

8.2. Prefixes included in attributive stems are numbered 51, 52, 61, 71.

Prefix 51 ʔaŋ- (*mouth*, etc.) may precede the At^1 stem ʔuma *dumb* to give the At^2 stem ʔaʔŋuma *tongue-tied*. In formula: 51 + At^1 = At^2.

Prefix 52 ko- ~ koʔ- (*head*, etc.) may precede the At^1 stem popo *white* to give the At^2 stem koʔpopo *white-haired*. In formula: 52 + At^1 = At^2.

Prefix 52 may also precede the N^1 stems

sawa *air* and poti *spot* to give the At^2 stems ko?sawa *crazy* and ko?poti *bald-headed*. In formula: $52 + N^1 = At^2$.

Prefix 61 ni- may precede certain At^1 stems. In formula: $61 + At^1 = At^2$. Example ni?oye *pretty good* (?oye *good*).

Prefix 71 saŋ- (*intensive*) may precede certain At^1 stems. In formula: $71 + At^1 = At^2$. Example: saŋyaci *completely bad* (yaci *bad*).

Prefix 71 may also precede certain At^2 stems. In formula: $71 + At^2 = At^3$. Example: saŋdome *very near* (tome *near*).

8.3. Suffixes included in attributive stems are numbered 313, 314.

Suffix 313 -?aŋ follows the N^2 stem naʌ?ci *fear* to give the At^3 stem na?čaŋ *frightful*. In formula: $N^2 + 313 = At^3$.

Suffix 314 -Xi ~ -Xe (*result of action*; for alternants, see **7.3**) may follow certain V^1 stems to give attributive stems. In formula: $V^1 + 314 = At^2$. Examples: sose *cooked* (sohs- *to cook*); mowe *partly incubated* (moŋ- *to set on eggs*); ha?se *toasted* (ha?s- *to toast*); ka?e *sick* (ka?- *to die*) tome *near* (tom- is set up as dependent V^1; it also appears in to?mʌy- *to draw near* [V^2]).

8.4.1. Compound attributive stems may consist of two attributive stems. In formula: At + At = At. In the following examples, both constituents are At^1, and the formula is $At^1 + At^1 = At^2$: yawapu?cʌ *rose-colored* (yawa *tender*, pu?cʌ *yellow*); capascuhcuh *purple* (capahs(-) *red*, cuhcuh *blue* or *green*).

8.4.2. A few compound attributive stems consist of a reduplicated At^1 or N^1 stem. Examples of reduplicated $At^1 = At^2$: čokohčokoyh *very slowly* (čokoyh *slowly*); ponihponih *very slowly* (ponih *slowly*); koŋgihkoŋgih *stiff* or *hard* (koŋgih *stiff* or *hard*). Example of reduplicated $N^1 = At^2$: nasnahs(-) *dirty* (nahs(-) *earth*).

8.4.3. One compound attributive stem consists of a reduplicated dependent morpheme which does not otherwise occur. We treat this as At^2. The form is tiŋdiŋ *thick*.

8.5. Morphological sequences which form attributives (Atr) may include suffixes 641, 651, 712, 721, 741, 742, 751, also prefixes 131, 132, 133.

8.5.1. An attributive stem (At) may constitute an attributive (Atr). This is the minimum sequence. In formula: At = Atr.

8.5.2. The minimum sequence At = Atr may be extended by the addition of a suffix of class 640 or 650. In formula: At + 640 or 650 = Atr.

Suffix 641 -ta?m (*plural*) immediately follows the attributive stem. In formula: At + 641 = Atr. Examples are: suñita?m *pretty* (*ones*) (suñi *pretty*), ya?aytʸa?m tometa?m *far and near* (*places*) (ya?ay *far*, tome *near*).

Suffix 651 -?aŋge (*repetitive*) may follow certain attributive stems. In formula: At + 651 = Atr. Examples are: ?oye?aŋge *also good* (?oye *good*), yʌti?aŋge *see you later* (yʌtih *now* or *in a little while*), homi?aŋge ~ homya?ŋge *see you tomorrow* (homi *tomorrow*).

8.5.3. The sequence At + 651 = Atr constitutes a maximum morphological sequence. But the minimum sequence At = Atr (**8.5.1**) or its extended form At + 641 = Atr (**8.5.2**) may be further extended by the addition of one or more suffixes of class 700. In formula: At ± 641 ± 712 ± 720 ± 740 ± 751 = Atr.

Suffix 712 -?k (*temporal*) may follow certain attributive stems. It may be word final, or certain suffixes of classes 720 or 740 may follow it. In formula: At + 712 ± 720 or 740 = Atr. Examples: ?oye?k *when it is good* ($At^1 + 712$), ?oye?ka?nde? *when it is already good* ($At^1 + 712 + 721 — Dm$), ?oye?kmah *when it is still good* ($At^1 + 712 + 742$).

Suffix 721 -?a ~ -a$^{\phi}$M- ~ -a?a (*perfective*; for alternants, see **5.6.3**) may immediately follow certain attributive stems; or suffix 641 or 712 may appear between the stem and 721. Suffix 721 may be word final, or suffix 751 may follow it. In formula: At ± 641 ± 712 + 721 ± 751 = Atr.

Examples with suffix 721 are: mʌha?a *it is already big* ($At^1 + 721$); ?oyeta?ma *they are already good* ($At^1 + 641 + 721$);

ʔoyeʔkaʔnde? *when it is already good* (At¹ + 712 + 721 − Dm), mʌhataʔmaha *are they already big?* (At¹ + 641 + 721 + 751).

Suffix 741 -tih (*limitational*) may immediately follow an attributive stem, or suffix 641 may appear between the stem and 741. Suffix 741 is word final (or followed by an enclitic). In formula: At ± 641 + 741 = Atr. Examples are: ʔoyetih *just good* (At¹ + 741); ʔoyetaʔmdih (*we*) *are just good* (At¹ + 641 + 741).

Suffix 742 -mah (*durative*) may immediately follow an attributive stem. In formula: At + 742 = Atr. Example: cokomahte? *it is still wet* (At¹ + 742 − Dm).

Suffix 751 -ha (*interrogative*) may follow a sequence of attributive stem plus certain suffixes. In the example shown, the formula is: At + 641 + 721 + 751. The form is: mʌhataʔmaha *are they already big?* (mʌha *big* = At¹).

8.5.4. In certain syntactic constructions, the minimum sequence At = Atr (**8.5.1**) or its suffixially extended forms At ± 641 ± 700ˣ = Atr (**8.5.2** and **8.5.3**) may be extended by the addition of a prefix of class 130. With prefixial and possible suffixial extensions, the formula is: 130 + At ± 641 ± 700ˣ = Atr. Prefixes of class 130 have the same distribution in attributives as they do in intransitive verbs. They mark subject of an attributive predication.

Prefix 131 N- may precede an attributive stem in a sequence with (not without) a preceding auxiliary. Examples: haʔnʌh mbopo *I am not white* (Aux − Prn ⁄⁄ 131 + At¹), haʔnʌh ŋgaʔe *I am not sick* (Aux − Prn ⁄⁄ 131 + At²). In this type of sequence, prefix 131 marks 1st person subject of an attributive predication.

Prefix 132 y- may precede an attributive stem in a sequence with (not without) a preceding auxiliary. Examples: haʔn ʔyoye *it is not good* (Aux ⁄⁄ 132 + At¹); haʔn kyaʔe *he is not sick* (Aux ⁄⁄ 132 + At²). In this type of sequence, prefix 132 marks 3rd person subject of an attributive predication.

Prefix 133 Ny- may precede an attributive stem in a sequence with or without an auxiliary. Examples without auxiliary: ŋgyaʔemih *you are sick* (133 + At² − Prn); ʔyoyetihmih *you are just all right* (133 + At¹ + 741 − Prn); ʔyoyetaʔmdih *you* (pl.) *are just all right* (133 + At¹ + 641 + 741). Example with auxiliary: haʔnmih ŋgyaʔe *you are not sick* (Aux − Prn ⁄⁄ 133 + At²). In both these types of sequence, prefix 133 marks 2nd person subject of an attributive predication.

9.0. Morphological sequences which characterize the intensive stem are summarized in **4.2** and shown in detail in **9.2.** The intensive stem (designated In) constitutes a minor stem class related to, but different from, noun stems (N); intensives (designated Int) constitute a minor word class related to, but different from, nouns (Nn). Intensives appear in enclitic position or (less frequently) in independent position.

9.1. The morpheme stem neʔ is the only member of the class of intensive stems (In). It is a person substitute with an intensive meaning.

9.2. Morphological sequences which form intensives (Int) may include prefix 132, suffix 641.

9.2.1. The intensive stem neʔ (In) may constitute an intensive (Int). This is the minimum sequence, marking 1st or 2nd person. In formula: In = Int. Most of the following examples show neʔ in a syntactic sequence: neʔ *myself* or *yourself* or *my own* or *your own* (in answer to a question 'whoʔ' or 'whoseʔ'), ncʌhkuʔs neʔ *I made mine* (the intensive neʔ follows the verb ncʌhku *I did it* plus the enclitic pronoun -ʔs *I*), ʔʌsneʔ *mine* (the intensive neʔ is enclitic to the pronoun ʔʌs *my*), misneʔ *your own* (the intensive neʔ is enclitic to the pronoun mis *your*), misteʔneʔ *it is yours* (both the demonstrative teʔ and the intensive neʔ are enclitic after the pronoun mis *your*); tʌsneʔ *ours* (the intensive neʔ is enclitic to the pronoun tʌs *our*).

9.2.2. The minimum sequence In = Int may be extended by the addition of prefix 132 y- to the stem ne?, marking 3d person. In formula: 132 + In = Int. Examples: ñe? *himself* or *his* (132 + In); hwa?ŋisñe? *John's own* (the intensive ñe? is enclitic to the noun hwa?ŋis *John's*); pʌ?niste?ñe? *it is a man's* (both the demonstrative te? and the intensive ñe? are enclitic after the noun pʌ?nis *of a man*).

9.2.3. The minimum sequence In = Int or its extension 132 + In = Int may be further extended by the addition of suffix 641 -ta?m to the stem, marking plural. In formula: ± 132 + In + 641 = Int. Examples: ne?ta?m *ourselves* or *yourselves* (In + 641); ñe?ta?m *themselves* (132 + In + 641).

10.0. Morphological sequences which characterize pronoun stems are summarized in **4.2.** and shown in detail in **10.2.** Pronoun stems and their analysis are given in **10.1.** Pronoun stems (designated Pr) constitute a minor stem class related to, but different from, noun stems (N); pronouns (designated Prn) constitute a minor word class related to, but different from, nouns (Nn).

10.1. Pronoun stems may consist of one morpheme (Pr^1), two morphemes (Pr^2), or three morphemes (Pr^3).

10.1.1. Pronoun stems consisting of one morpheme are now listed.

(?ʌh ∼ -?h) ∼ ?ʌ?ʌ- *I* or *me* is 1st person singular. The alternant ?ʌh appears in independent position and certain enclitic positions; -?h occurs in certain enclitic positions, especially in rapid speech. ?ʌ?ʌ- is a dissyllabic alternant formed as are dissyllabic alternants of certain noun stems (cf. **7.1.1**).

mih ∼ mi?i- *you* is 2nd person (singular or plural). The form mi?i- is a dissyllabic alternant.

tʌh (∼ tʌ in certain forms) ∼ tʌ?ʌ- *we* or *us* is 1st person plural. The form tʌ?ʌ- is a dissyllabic alternant.

?iwʌ *who* is interrogative or relative, referring to humans. It is susceptible of subanalysis into a unique stem ?i- (which occurs only in ?iwʌ in this dialect but as a free form in certain other dialects) plus suffix 411, but is here treated as Pr^1 by analogy with tiyʌ (next paragraph), which is not so easily sub-analyzed.

tiyʌ *what* or *thing* is an interrogative, relative, or general, referring to non-human objects.

10.1.2. Pronoun stems consisting of two or three morphemes (Pr^2 or Pr^3) include those containing the intensive stem ne? followed by suffix 312 -kʌ? ∼ -kʌ (the alternant -kʌ appears in pronoun stems, -kʌ? in noun stems [**7.3.1**]); prefix 132 may be present or absent. Without prefix 132, the formula is: In + 312 = Pr^2; the form is ne?kʌ *myself* or *yourself*. With prefix 132, the formula is: 132 + In + 312 = Pr^3; the form is ñe?kʌ *he* or *himself* or *she* or *herself*.

The Pr^1 stems tiyʌ and ?iwʌ may follow prefixes of class 80 to form Pr^2 stems. In formula: 80 + Pr^1 = Pr^2. Prefix 81 yah- appears in yahtiyʌ *nothing* and ya?iwʌ *no one*; prefix 82 ñempe- ∼ wempe- ∼ yempe- (idiolectal alternation) appears in ñempetiyʌ *anything* and ñempe?iwʌ *anyone*.

10.2. Morphological sequences which form pronouns (Prn) may include suffixes 611, 612, 613, 614, 615, 617, 621, 622, 623, 624, 626; 641; 721, 731, 732, 741, 751.

10.2.1. A pronoun stem (Pr) may constitute a pronoun (Prn). This is the minimum sequence. In formula: Pr = Prn. If the stem is ?ʌh, mih, tʌh, the pronoun may appear in enclitic position. Examples in enclitic position: minu?ʌh *I came* (minu = Vb); nʌ?h minu *I am coming* (nʌ = Aux); mbyʌnmih *you are a man* (mbyʌn = Nn). Examples in independent position: ?ʌh minu *I came*; mihte? *it is you* (the demonstrative te? is enclitic to the pronoun); ñe?kʌ maŋu *he went*; ?iwʌte? *who is it?*

10.2.2. The minimum sequence Pr = Prn may be extended by the addition of a class 610–620 suffix or class 640 suffix or both. In formula: Pr ± 610–620 ± 640 = Prn.

Suffixes of class 610–620 immediately follow the pronoun stem (except under certain

conditions when 641 is present; see below under 641). They may be word final or followed by suffix of class 640 (also by certain other suffixes; see **10.2.3**). In formula: Pr + 610–620 ± 640 = Prn.

The alternants of suffix 611 that occur in pronouns are -s (after ʔʌh, mih, tʌh [with loss of h by **3.7**]) and -ʔs (after other pronoun stems).

In the following examples, suffix 611 is word final (formula Pr + 611 = Prn); the pronoun is given in a syntactic sequence. Pronouns formed from ʔʌh, mih, tʌh plus 611 may be in either independent or enclitic position. Examples: ʔʌs ndʌk *my house* (ʔʌh 1st person singular); mis ndʌk *your house* (mih 2nd person); tʌs ndʌk *our house* (tʌh 1st person plural); ñeʔkʌʔs tʸʌk *his house* (ñeʔkʌ *he*); ʔʌs ncʌhku *I did it* (ʔʌh 1st person singular); ncʌhkuʔʌs ~ ncʌhkuʔs *I did it* (here ʔʌs is enclitic and may be shortened to -ʔs); mis ncʌhku *you did it* (mih 2nd person); ncʌhkumis *you did it* (here mis is enclitic), mis ncʌhkumis *you did it* (here mis appears twice, in both enclitic and independent positions); tʌs ncʌhku *we did it* (tʌh 1st person plural); ʔiwʌʔs čʌhku *who did it?* (ʔiwʌ *who*).

In the following examples, suffix 641 follows 611 (formula Pr + 611 + 641 = Prn); the pronoun is in independent position mistaʔm ndʌk *your* (pl.) *house* or *your* (sg.) *houses*; mistaʔm ncʌktamu *you* (pl.) *did it*; tʌstaʔm ncʌhku *we did it*; neʔkʌʔstaʔm čʌkyahu *they did it.*

In the following examples, suffix 612 -hiʔŋ (*comitative*) is word final (formula Pr + 612 = Prn): ʔʌhiʔŋ *with me*, tʌhiʔŋ *with us*, ñeʔkʌhiʔŋ *with him*, ʔiwʌhiʔŋ *with whom?* Suffix 641 may follow 612 (formula Pr + 612 + 641 = Prn): tʌhiʔŋdaʔm *with us*, ñeʔkʌhiʔŋdaʔm *with them.*

In the following examples, suffix 613 -piht(-) (*instrumental*) is word final (formula Pr + 613 = Prn): ʔʌhpit *by me*, mihpit *by you*, ñeʔkʌpit *by him*. Suffix 641 may follow 613 (formula Pr + 613 + 641 = Prn): mihpittaʔm *by you* (pl.).

In the following examples, suffix 614 -kotoya (*benefactive*) is word final (formula Pr + 614 = Prn): ʔʌhkotoya *for me*, mihkotoya *for you*, ñeʔkʌkotoya *for him*, ʔiwʌkotoya *for whom?*, tiyʌkotoya *what for?* or *why?* Suffix 641 may follow 614 (formula Pr + 614 + 641 = Prn): mihkotoyataʔm *for you* (pl.).

In the following example, suffix 615 -ʔaŋi (*locative*) is word final (formula Pr + 615 = Prn): ʔʌʔaŋi *near me*. Suffix 641 may follow 615 (formula Pr + 615 + 641 = Prn): ñeʔkaʔŋitaʔm *near them.*

In the following example, suffix 617 -ʔohmo (*locative*) is word final (formula Pr + 617 = Prn): ʔʌʔohmo *in me*. Suffix 641 may follow 617 (formula Pr + 617 + 641 = Prn): miʔohmotaʔm *among you.*

In the following examples, suffix 621 -kʌsi (locative *on*) is word final (formula Pr + 621 = Prn): ʔʌhkʌsi *on me*, mihkʌsi *on you*, ñeʔkʌkʌsi *on him*. Suffix 641 may follow 621 (formula Pr + 621 + 641 = Prn): mihkʌsitaʔm *on you* (pl.).

In the following example, suffix 622 -kʌsmʌ (locative *above*) is word final (formula Pr + 622 = Prn): ñeʔkʌkʌsmʌ *above him.*

In the following example, suffix 623 -kʌʔy (locative *under*) is word final (formula Pr + 623 = Prn): ñeʔkʌkʌʔy *alongside of him.*

In the following example, suffix 624 -kʌʔmʌ (locative *under*) is word final (formula Pr + 624 = Prn): ñeʔkʌkʌʔmʌ *under him.*

In the following examples, suffix 626 -kukmʌ (locative *in the middle of*) is word final (formula Pr + 626 = Prn): ñeʔkʌkukmʌ *in the middle of them*; tʌhkukmʌ *in the midst of us*. Suffix 641 may follow 626 (formula Pr + 626 + 641 = Prn): ñeʔkʌkukmʌtaʔm *in the middle of them*; tʌhkukmʌtaʔm *in the midst of us*; mihkukmʌtaʔm *in the midst of you.*

Suffix 641 -taʔm (*plural*) may immediately follow certain pronoun stems. Or a class 610–620 suffix may appear between the pro-

noun stem and 641. In formula: Pr ± 610–620 + 641 = Prn.

In the following examples, suffix 641 immediately follows a pronoun stem (formula Pr + 641 = Prn): mihtaʔm *you* (pl.), tʌhtaʔm *we* (with plurality emphasized), ñeʔkʌtaʔm *they*, tiyʌtaʔm *things*, ʔiwʌtaʔm *who?* (pl.).

Examples in which a class 610–620 suffix appears between the pronoun stem and 641 are seen above under the 610–620 suffixes.

Contrasting with the usual order of suffixes 610–620 + 641 is the form tʌtaʔmgotoya *for us* (Pr^{1} + 641 + 614). The stem is the 1st person plural alternant tʌ, and the meaning *for us* is apparently used in a general sense (like French 'on'); contrast tʌhkotoyataʔm (Pr^{1} + 614 + 641), where the stem is the 1st person plural alternant tʌh, and the meaning *for us* is used in a specific sense.

10.2.3. The minimum sequence Pr = Prn (**10.2.1**) or its extended forms Pr ± 600^{x} = Prn (**10.2.2**) may be further extended by the addition of certain suffixes of class 700. In formula: Pr ± 600^{x} ± 720 ± 730 ± 740 ± 751 = Prn.

Suffixes of class 700 occur in an order similar to the order in which they occur in nouns (but suffix 732 has not been found in pronouns in the same sequence with 641).

Suffix 721 -ʔa ~ -aʔM ~ -aʔa (*perfective*; for alternants (see **5.6.3**), may immediately follow the pronoun stem, or suffix 611 may appear between the stem and 721. In formula: Pr ± 611 + 721 = Prn. Suffix 721 is word final (or followed by an enclitic).

In the following examples, suffix 721 immediately follows the pronoun stem: ʔʌʔa *I already* (as in ʔʌʔa minu *I already came*), miʔa *you already*, tʌʔa *we already*, ʔiwaʔ *who now?*, tiyaʔ *what now?*

In the following examples, suffix 611 appears between the stem and 721: ʔʌsa *I already* (as in ʔʌsa ncʌhku *I already did it*), misa *you already*, ʔiwʌʔsa *who now?* (as in ʔiwʌʔsa čʌhku *who now did it?*).

Suffix 731 -hsʌʔŋ (*potential*) appears in the example: tiyahsʌʔŋ *what may it be?* (Pr^{1} + 731 = Prn).

Suffix 732 -šeh (*similative*) appears in the examples: mihšeh *like you* (Pr^{1} + 732 = Prn); mihšehtaʔm *like you* (pl.) (Pr^{1} + 732 + 641 = Prn).

Suffix 741 -tih (*limitational*) appears in the examples: ʔʌhtihteʔ *it is only I* (Pr^{1} + 741 − Dm = Prn − Dm); ñeʔkʌtih *only he* (Pr^{3} + 741 = Prn); tʌhtaʔmdih *only we* (Pr^{1} + 641 + 741 = Prn).

Suffix 751 -ha (*interrogative*) appears in the examples: ʔiwʌha *who?* (Pr^{1} + 751 = Prn); mihateʔ *is it you?* (Pr^{1} + 751 − Dm = Prn − Dm).

11.0. Morphological sequences which characterize demonstrative stems are summarized in **4.2** and shown in detail in **11.2.** Demonstrative stems are listed in **11.1.** Demonstrative stems (designated D) constitute a minor stem class related to, but different from, noun stems (N), demonstratives (designated Dm) constitute a minor word class related to, but different from, nouns (Nn).

11.1. Demonstrative stems each consist of a single morpheme. There are three such morphemes: yʌʔ near, ʔʌʔ remote, teʔ neutral (as to location).

In certain positions, these three stems may be translated yʌʔ *this*, ʔʌʔ *that*, teʔ *the*, in certain other positions, they mark a certain type of predication.

11.2. Morphological sequences which form demonstratives (Dm) may include suffixes 614, 619, 331, 721, 732; also 631, 711, 741, 742; also 641.

11.2.1. A demonstrative stem (D) may constitute a demonstrative (Dm). This is the minimum sequence. In formula: D = Dm. The demonstrative may be either proclitic or enclitic. Examples in proclitic position: teʔpʌn *the man* (pʌn *man*), yʌʔpʌn *this man*, ʔʌʔpʌn *that man*. Examples in enclitic position: pʌndeʔ *he is a man*, ʔʌhteʔ *it is I*, ʔʌhyʌʔ *this is I*, mihyʌʔ *it is you*, tiyaʔʌʔ *what now is that?*

11.2.2. The minimum sequence D = Dm may be extended by the addition of one or

more of the suffixes 614, 619, 331, 721, 732. In formula: D ± 614 or 619 or 721 or 732 ± 331 = Dm. Such an extension equals a demonstrative (Dm); these extensions occur in independent positions.

Suffix 614 -kotoya (*benefactive*) may follow the D stems te? and yʌ?. In formula: D + 614 = Dm. The forms are: te?kotoya *therefore*, yʌ?kotoya *for this (reason)*.

Suffix 619 -i ∼ -y (*locative*) may follow any of the three D stems. The -y alternant appears, with loss of the ? that precedes it. In formula: D + 619 = Dm. The forms are: tey *there*, yʌy *here*, ?ʌy *there* (more remote than tey).

Suffix 331 -mʌ (*locative*) may immediately follow the D stems yʌ? and ?ʌ? with loss of ? before the suffix. In formula: D + 331 = Dm. The forms are: yʌmʌ *here*, ?ʌmʌ *there*. Suffix 331 may also follow the sequence of the D stem te? plus 619. In formula: D + 619 + 331 = Dm. The form is teymʌ *there* (less remote than ?ʌmʌ).

Suffix 721 -?a ∼ -a?M- ∼ -a?a (*perfective*) may follow the D stem te?. In formula: D + 721 = Dm. The sequence may be followed by an enclitic pronoun. Examples are seen in the following: ?ʌ?wʌ?s te?a čʌhku *it is that he already did it* (te?a = D + 721 = Dm); ?ʌs te?a?mʌs ncʌhku *it is that I already did it* (te?a?mʌs = D + 721 − Prn = Dm − Prn); mista?m te?a?mis ncʌhku *it is that you* (pl.) *already did it* (te?a?mis = D + 721 − Prn = Dm − Prn).

Suffix 732 -šeh (*similative*) may follow any of the three D stems. In formula: D + 732 = Dm. The forms are: te?šeh *this way* or *thus*, yʌ?šeh *this way*, ?ʌ?šeh *that way*.

11.2.3. The sequence D + 619 or 331 or 732 = Dm may be further extended by the addition of certain of suffixes 631, 711, 741, 742. Formulae are shown under the specific suffixes.

Suffix 631 -k (*from*) may follow the sequence D + 331 = Dm, or D + 619 + 331 = Dm. In formula: D ± 619 + 331 + 631 = Dm. The forms are: yʌmʌk *from here*, ?ʌmʌk *from there*, teymʌk *from there*.

Suffix 711 -mʌy (*locative*) may follow the sequence D + 732 = Dm. In formula: D + 732 + 711 = Dm. Example: te?šehmʌy *where it is thus*.

Suffix 741 -tih (*limitational*) may follow the sequence D + 619 = Dm, or D ± 619 + 331 = Dm, or D + 732 = Dm. Examples are shown with specific formula for each: teytʸih *right there* (D + 619 + 741); yʌytʸih *right here* (D + 619 + 741); yʌmʌtih *right here* (D + 331 + 741); teymʌtih *right there* (D + 619 + 331 + 741); te?šehtih *just like that* (D + 732 + 741).

Suffix 742 -mah (*temporal*) may follow the sequence D + 732 = Dm. In formula: D + 732 + 742 = Dm. Example: te?šehmah *still like this*.

11.2.4. Suffix 641 -ta?m (plural) may follow a demonstrative stem, but only in dependent position before suffix 411. The resulting form is a participle stem (see **13.1.4**). Examples: ?ʌ?ta?mbʌ *those* (D + 641 + 411 = Pp); yʌ?ta?mbʌ *these* (D + 641 + 411 = Pp).

12.0. Morphological sequences which characterize numeral stems are summarized in **4.2** and shown in detail in **12.2.** Numeral stems and their analysis are given in **12.1.** Numeral stems (designated Nm) constitute a minor stem class related to, but different from, noun stems (N); numerals (designated Num) constitute a minor word class related to, but different from, nouns (Nn).

12.1. Numeral stems may consist of one morpheme (Nm^1) or two morphemes (Nm^2).

12.1.1. Numeral stems consisting of one morpheme (Nm^1) are now listed.

tum- *one*.

mec- ∽ mehc- ∽ wʌstʌhk- *two* (mec- precedes suffix 811 as in meca *two*; mehc- precedes suffix 841 in mehci?ŋ *two by two*; wʌstʌhk- appears in Nm^2 stems and before suffixes of class 830; makwʌstʌhk- *twelve*, wʌstʌhki?s *forty*, wʌstʌkmʌy *day after tomorrow*, wʌstʌkya?a *day before yesterday*).

tuk- ~ tuku- *three* (tuk- precedes suffixes of class 810 as in tuka?y *three*, and occurs in the Nm^2 stem tuki?s *sixty*; tuku- [dissyllabic alternant; cf. **7.1.1**] occurs in the Nm^2 stem tukutuht- *eight*).

maks- ~ makš- ~ maktahs- *four* (maks- appears in the Nm^2 stem makstuht- *nine* makš- precedes suffix 811 in makšku?y *four*; maktahs- appears in the Nm^2 stems makmaktahs- *fourteen* and maktahsi?s *eighty*).

mohs(-) *five*.

tuht- *six*.

ku?y- ~ kuy- *seven* (ku?y- precedes suffix 811 in ku?ya?y *seven*; kuy- precedes suffixes of class 830 as in kumyʌy *seven days hence*.

mahk(-) *ten*.

yʌht(-) *fifteen*

?ips ~ -i?s *twenty* (?ips appears in independent position or in non-final position in a complex form, as in ?ips *twenty*, ?ipskotumʌ *twenty-one*; -i?s appears as second member in Nm^2 stems, as in wastʌhki?s *forty*).

12.1.2. Numeral stems consisting of two morphemes (Nm^2) are compounds of two of the Nm^1 stems listed in **12.1.1.** In formula: $Nm^1 + Nm^1 = Nm^2$. These may be classified into two groups on the basis of distribution; the formal classification is paralleled by a difference in internal semantic relationship.

Certain Nm^2 stems have -i?s *twenty* as second member of the compound; these may occur in independent position. Examples show all the Nm^2 stems which consist of -i?s as second member preceded by another Nm^1 stem; the first Nm^1 stem is shown in parentheses after each example: wastʌhki?s *forty* (wastʌhk- *two*); tuki?s *sixty* (tuk- *three*); maktahsi?s *eighty* (maktahs- *four*); mohsi?s *one hundred* (mohs(-) *five*); mahki?s *two hundred* (mahk(-) *ten*); yʌhti?s *three hundred* (yʌht(-) *fifteen*).[42] The numerical value of these equals the product of the two constituents; they may therefore be labeled semantically as multiplicative compounds.

Other Nm^2 stems occur only in bound or dependent position. They are: tukutuht- *eight* (tuku- *three*, tuht- *six*); makstuht- *nine* (maks- *four*, tuht- *six*); maktum- *eleven* (mahk(-) *ten*, tum- *one*); makwastʌhk- *twelve* (mahk(-) *ten*, wastʌhk- *two*); maktuk- *thirteen* (mahk(-) *ten*, tuk- *three*); makmaktahs- *fourteen* (mahk(-) *ten*, maktahs- *four*). These may be labeled semantically as additive compounds; i.e. compounds whose numerical value equals the sum of the two constituents. But note that this is not mathematically true for tukutuht- *eight* and makstuht- *nine* unless we postulate some system of numeration in which one of a series of units is counted twice.

12.2. Morphological sequences which form numerals (Num). (These sequences may include suffixes 811, 812, 821, 822, 831, 832, 841; also suffix 651; also suffix 641).

12.2.1. The Nm^1 stem ?ips *twenty* and Nm^2 stems whose second member is its alternant -i?s (as wastʌhki?s *forty*) constitute numerals (Num). This is a minimum sequence. In formula: Nm = Num.

For certain other Nm^1 stems, the minimum sequence which may constitute a numeral (Num) is that of the stem (Nm) plus a suffix of class 810 or 830 or 840. In formula: Nm + 810 or 830 or 840 = Num. Examples: tumʌ *one* (Nm^1 + 812); meca *two* (Nm^1 + 811); wastʌkmʌy *day after tomorrow* (Nm^1 + 831); mehci?ŋ *two by two* (Nm^1 + 841).

For other Nm^1 and Nm^2 stems, the minimum sequence is that of the stem plus a suffix of class 810 plus a suffix of class 820 or 830. In formula: Nm + 810 + 820 or 830 = Num. Examples: tuka?y *three* (Nm^1 + 811 + 821); makšku?y *four* (Nm^1 + 811 + 821); maktuma?y *eleven* (Nm^2 + 811 + 821).

We now show each of the suffixes that may occur in numerals (Num).

Suffixes of class 810 immediately follow the Nm stem. They may be word final or

[42] Certain neighboring dialects have additional numeral stems formed with -i?s as second member, in certain numbers above one hundred which are multiples of twenty.

followed by certain other suffixes. In formula: Nm + 810 ± 820 or 830 = Num.

Suffix 811 is -a ~ -ku-. The alternant -ku- appears after the Nm^1 stem makš- *four* or the Nm^2 stem makmaktahs- *fourteen* (whose second member is the Nm^1 alternant maktahs- *four*). The alternant -a may appear after any Nm stem other than these and ʔips *twenty* (which does not precede class 800 suffixes).

Suffix 811 appears word final in the numeral meca *two* (Nm^1 + 811). In other sequences it is followed by a suffix of class 820. In formula: Nm + 811 ± 820 = Num.

Examples of Nm + 811 + 821 are: tukaʔy *three* (tuk- *three* = Nm^1); makškuʔy *four* (makš- *four* = Nm^1); mohsaʔy *five* (mohs(-) *five* = Nm^1); tukutuhtaʔy *eight* (tukutuht- *eight* = Nm^2); makstuhtaʔy *nine* (makstuht- *nine* = Nm^2); maktumaʔy *eleven* (maktum- *eleven* = Nm^2).

Examples of Nm + 811 + 822 are shown in morphological sequence with a noun stem pʌn *man* (N^1) (cf. **12.3**): tumaʔŋbʌn *one man* (tum- *one* = Nm^1); mecaʔŋbʌn *two men* (mec- *two* = Nm^1); tukaʔŋbʌn *three men* (tuk- *three* = Nm^1); makškuʔŋbʌn *four men* (makš- *four* = Nm^1); tukutuhtaʔŋbʌn *eight men* (tukutuht- *eight* = Nm^2).

Suffix 812 -ʌ appears word final in the numeral tumʌ *one* (Nm^1 + 812). It is followed by a suffix of class 830 in the forms tukʌmʌy *three days hence* (Nm^1 + 812 + 831); tukʌʔyah *three days ago* (Nm^1 + 812 + 832).

Suffixes of class 820 follow a sequence of Nm + 811. They are word final (or in morphological sequence with a following noun stem; see **12.3**). In formula: Nm + 810 + 820 = Num.

Suffix 821 is -ʔy, with the alternant -ʔ before another word in rapid speech. It may follow suffix 811 after all Nm stems that take 811 except mec- *two*. In formula: Nm + 811 + 821 = Num. For examples of suffix 821 in word final position, see above under suffix 811. An example with a following noun stem is: tukaʔpyʌni *three (men) together* (for additional examples see **12.3**).

Suffix 822 -ʔŋ may follow suffix 811 after all Nm stems that take 811. It occurs in morphological sequence with a following noun stem. For examples of 822 see above under suffix 811; cf. **12.3**.

Suffixes of class 830 may immediately follow certain Nm stems; with certain other stems a suffix of class 810 appears between the stem and the 830 suffix. The 830 suffix is word final. In formula: Nm ± 810 + 830 = Num.

Suffix 831 -mʌy (*days hence*) immediately follows the Nm stem in the following Num forms: wʌstʌkmʌy *day after tomorrow* (i.e. *two days hence*; wʌstʌhk- *two*); kumyʌy *seven days hence* (kuy- *seven*).

Suffix 812 appears between the Nm stem and suffix 831 in tukʌmʌy *three days hence* (tuk- *three* = Nm^1; -ʌ = 812).

Suffix 831 marks *days hence*; it is restricted in numerals to the sequences cited.[43]

Suffix 832 is -yaʔa ~ -ʔyah (*days ago*); the alternant -yaʔa appears after the stems wʌstʌhk- *two* and kuy- *seven*; -ʔyah appears after the sequence of stem tuk- *three* plus suffix 812. In numerals, 832 appears only in these sequences.[44]

Suffix 832 immediately follows the Nm stem in the following Num forms: wʌstʌkyaʔa *day before yesterday* (i.e. *two*

[43] But suffix 831 also occurs in ʔametʌmʌy *a year hence* (ʔame *year* = N^1; -mʌy = 831; -tʌ- is a unique morpheme); this sequence was not included under nouns, but is probably to be classified as a noun (Nn). Note that suffix 831 is homophonous with suffix 711; an alternative treatment would class these both as a single morpheme.

[44] But compare ʔameʔa *a year ago* (ʔame *year* = N^1; -ʔa is apparently to be equated with 832, but is problematic). Note the parallellism between this and the form ʔametʌmʌy of the preceding footnote. ʔameʔa is probably also to be classified as a noun (Nn). Note that the form of the suffix in ʔameʔa is homophonous with one alternant of suffix 721; an alternative treatment would class this and the forms listed for suffix 832 all as alternants of 721.

days ago; wastʌhk- *two*); kuya?a *seven days ago* (kuy- *seven*).

Suffix 812 appears between the Nm stem and suffix 832 in tukʌ?yah *three days ago* (tuk- *three* = Nm[1]; -ʌ = 812).

Suffix 841 -i?ŋ occurs in the form mehci?ŋ *two by two* (Nm[1] + 841).[45]

Suffix 641 -ta?m (*plural*) occurs in the numeral form mecta?m *two* (Nm[1] + 641).

12.2.2. In addition to numerals (Num) formed from Nm[1] or Nm[2] plus suffixes, the other numerals under *four hundred* consist of sequences of two or more numeral stems joined by the connective -ko-.[46] The specific Nm stems are shown in parentheses after each of the following examples: ?ipskomos *twenty-five* (?ips *twenty*, mohs(-) *five*); ?ipskomak *thirty* (?ips *twenty*, mahk(-) *ten*); ?ipskoyʌt *thirty-five* (?ips *twenty*, yʌht(-) *fifteen*); wastʌhki?skomak *fifty* (wastʌhki?s *forty*, mahk(-) *ten*); mohsi?skowastʌhki?skomak *one hundred fifty* (mohsi?s *one hundred*, wastʌhki?s *forty*, mahk(-) *ten*).

If the last Nm stem of the sequence is other than mohs(-), mahk(-), yʌht(-), ?ips, it has the same suffixes it would have in independent position. Examples: yʌtkotumʌ *sixteen* (yʌht(-) *fifteen*, tum- *one*; -ʌ 812); ?ipskotuka?y *twenty-three* (?ips *twenty*, tuk- *three*; -a 811, -?y 821); ?ipskoyʌtkomakšku?y *thirty-nine* (?ips *twenty*, yʌht(-) *fifteen*, makš- *four*; -ku- 811, -?y 821).

12.2.3. The number *four hundred* is a syntactic sequence tumʌ mone (tumʌ = Nm[1] + 812 = Num; mone is a noun stem [N]). Numbers above four hundred consist of the phrases tumʌ mone *four hundred*, meca mone *eight hundred*, tuka? mone *twelve hundred*, etc., followed by the connective -ko- plus a numeral formed as in the preceding sections. Examples are: tumʌ monekomohsi?s *five hundred*, tumʌ monekomohsi?skowastʌhki?-skoyʌtkotumʌ *five hundred fifty-six*, meca monekomahki?s *one thousand*.[47]

12.3. Two types of morphological sequence exist which involve a numeral (Num) plus a noun stem (N). Although we treat these sequences as morphological because of their phonological pattern which is that found within the word, the resulting forms are not assignable to any of the stem or word classes listed in **4.1–4.2.** They constitute a separate class.[48]

The sequence Nm + 811 + 822 = Num may precede a noun stem (N). In the following examples, Nm + 811 + 822 precede pʌn *man*; note that p is changed to b as within a word: tuma?ŋbʌn *one man*, meca?ŋbʌn *two men*, tuka?ŋbʌn *three men*, makšku?ŋbʌn *four men*.

The sequence Nm + 811 + 821 = Num may precede a sequence of N + 851. The specific noun stem (N) is always pʌn *man*;

[45] An alternative analysis would equate the unique suffix 841 -i?ŋ with suffix 612 -hi?ŋ (note the possible semantic relation). The stem in mehci?ŋ could then be stated as mec- and the suffix as -hi?ŋ, with a morphophonemic statement that Vc + h > Vhc. The example of this morphophonemic operation would be unique, but so would the morphophonemic sequence of Vc + h be unique.

[46] These might equally well be treated as syntactic sequences, and -ko- as an enclitic particle. A parallel syntactic form would then be tustungo meca tumin *seventy-five cents* (*six reales*), in which tustun *fifty cents* = Nn; -ko = enclitic [note change of k to g after nasal as within words]; meca *two* = Num; tumin *money* or *real* = Nn.

[47] González (see under Grasserie in **0.2** of this series), in his section on numerals, gives the form tzuno (in our present transcription *cuno or *cunʌ) *eight thousand*. For multiples of this, he writes vestec tzuno *sixteen thousand* (the first word corresponds in our present transcription to wastʌhk- *two*), tucay tzuno *twenty-four thousand* (the first word corresponds to tuka?y *three*). Attempts to elicit such forms from present-day speakers of Zoque have been unsuccessful. One informant gave ?ips mone *eight thousand*; this was probably formed by him on analogy with other forms.

[48] The separate class might equally well be treated as a type of syntactic sequence in which the relationship of the numeral and the noun stem is one similar to that of word plus enclitic; i.e. the morphophonemic operations occur as within a word, but the relationship is syntactic rather than morphological. This is one of a number of 'border-line' cases between morphology and syntax.

suffix 851 -i occurs only in this type of sequence. Note that the y of suffix 821 undergoes metathesis with the following p as within a word (contrast the phrase tukaʔy pʌn *three men*): tukaʔpyʌni *three together*, makšku ʔpyʌni *four together*.

13.0. Morphological sequences which characterize participle stems are summarized in **4.2** and shown in detail in **13.2.** Analysis of participle stems is given in **13.1.** Participle stems (designated Pp) constitute a minor stem class related to, but different from, noun stems (N); participles (designated Ppl) constitute a minor word class related to, but different from, nouns (Nn).

13.1. Participle stems (Pp) consist of two or more morphemes. They are formed by adding suffix 411 to a verb (Vb), noun (Nn), attributive (Atr), demonstrative (Dm), or numeral (Num). Note that suffix 411 is added to word classes; it may be added to stems (N, At, D) only when such stems also constitute a morphological sequence which makes them members of a word class (N = Nn, etc.).

Suffix 411 is -pʌ ~ -wʌ. The alternants are freely variable in some sequences; examples are: mʌhawʌ ~ mʌhapʌ *big*, ʔihtuwʌ ~ ʔihtupʌ *the one living*. In certain sequences, the alternant -wʌ appears either exclusively or with a high degree of frequency; examples are: putpawʌ *the one who goes out*, popowʌ *white*, ʔʌʔwʌ *that one*. In certain sequences, including most forms in which 411 follows a consonant, the alternant -pʌ appears either exclusively or with a high degree of frequency; examples are kupyʌ *wooden*, popotaʔmbʌ *white (ones)*, capaspʌ *red*, yʌkpʌ *black*, ʔʌʔtaʔmbʌ *those ones*).

13.1.1. Participle stems based on verbs may be shown by the formula: Vb + 411 = Pp. In the following examples, suffix 411 follows a verb; the verb analysis is given in parentheses after each example: minbawʌ *one who comes* (minba *he comes* = V^1 + 562 = Vb); mingeʔtuwʌ *one who also came* (mingeʔtu *he also came* = V^1 + 551 + 561 = Vb); kaʔuwʌ *dead* or *a dead person* (kaʔu *he died* = V^1 + 561 = Vb); kaʔyahuwʌ *dead persons* (kaʔyahu *they died* = V^1 + 532 + 561 = Vb); yahkaʔopyawʌ *murderer* (yahkaʔopya *he murders* = V^3 + 562 = Vb); muspawʌ *one who knows* (muspa *he knows* = V^1 + 562 = Vb); myuspawʌ *that which he knows* (myuspa *he knows it* = 132 + V^1 + 562 = Vb).

Note that participle stems based on intransitive verbs are identified with the subject of the verb; but those based on transitive verbs are identified with the object of the verb (they may be extended by suffix 611 to identify them with the subject of the transitive verb; see **13.2.2**).

13.1.2. Participle stems based on nouns may be shown by the formula: Nn + 411 = Pp. In the following examples, suffix 411 follows a noun; the noun analysis is given after each example: kupyʌ *wooden* (kuy *wood* = N^1 = Nn); kamahpyʌ *oaken* (kamayh *oak* = N^1 = Nn); kumguʔyohmopʌ *living in town* (kumguʔyohmo *in town* = N^2 + 617 = Nn); kumguʔyohmotaʔmbʌ *those living in town* (kumguʔyohmotaʔm *living in town* = N^2 + 617 + 641 = Nn); cinuhiʔŋbʌ *characterized by having honey* (cinuhiʔŋ *with honey* = N^1 + 612 = Nn); ʔyunehiʔŋbʌ *having her children with her* (ʔyunehiʔŋ *with her children* = 132 + N^1 + 612 = Nn); nahsakopahkʌsiwʌ *being on earth* or *earthly* (nahsakopahkʌsi *on earth* = N^2 + 621 = Nn).

13.1.3. Participle stems based on attributives may be shown by the formula: Atr + 411 = Pp. In the following examples, suffix 411 follows an attributive; the attributive analysis is given after each example: mʌhawʌ *big* (mʌha *big* = At^1 = Atr); mʌhataʔmbʌ *big ones* (mʌhataʔm *big* (pl.) = At^1 + 641 = Atr); suñitaʔmbʌ *pretty ones* (suñitaʔm *pretty* (pl.) = At^1 + 641 = Atr); ʔeyapʌ ~ ʔeyawʌ *another* (ʔeya *other* = At^1 = Atr); ʔeyataʔmbʌ *others* (ʔeyataʔm- = At^1 + 641 = Atr [but occurring only with 411]).

13.1.4. Participle stems based on demon-

stratives may be shown by the formula: Dm + 411 = Pp.

Participles based on demonstrative stems (D) which constitute a morphological sequence (D = Dm) are the following: ʔʌʔwʌ *that one* (ʔʌʔ = D = Dm); yʌʔwʌ *this one* (yʌʔ = D = Dm); teʔwʌ *the one* (teʔ = D = Dm).

Participles may also be based on demonstratives consisting of stem plus 641 (D + 641 = Dm); such demonstratives occur only when followed by 411 (see **11.2.4**). The forms are: ʔʌʔtaʔmbʌ *those ones* (ʔʌʔtaʔm- = D + 641); yʌʔtaʔmbʌ *these ones* (yʌʔtaʔm- = D + 641).

13.1.5. Participle stems based on numerals may be shown by the formula: Num + 411 = Pp.

Participles may be based on numerals consisting of stem plus suffixes of class 800 (Nm + 810 + 820). Examples are: tukaʔpyʌ *occurring in threes* (tukaʔy *three* = Nm^1 + 811 + 821 = Num); maktukaʔpyʌ *having thirteen of something* (maktukaʔy *thirteen* = Nm^2 + 811 + 821 = Num).

Participles may also consist of a numeral (Num) plus suffix 617 or 641 plus suffix 411. In formula: Num + 617 or 641 = Pp. Examples with suffix 617 -ʔohmo are: tukaʔyohmopʌ *third* (tukaʔy *three* = Nm^1 + 811 + 821 = Num); makškuʔyohmopʌ *fourth* (makškuʔy *four* = Nm^1 + 811 + 821 = Num); mecoʔmopʌ *second* (meca *two* = Nm^1 + 811 = Num); tumʌpʌ *only* (tumʌ *one* = Nm^1 + 812 = Num). Examples with suffix 641 -taʔm are: mecataʔmbʌ *two* (meca *two* = Nm^1 + 811 = Num); tukaʔytʸaʔmbʌ *three* (tukaʔy *three* = Nm^1 + 811 + 821 = Num).

13.2. Morphological sequences which form participles (Ppl) may include suffixes 611, 612, 613, 614, 616, 617, 621, 622, 624, 626; also 641, 721, 741, 742, 731, 751.

13.2.1. In the examples shown in **13.1.1–13.1.5**, the participle stem (Pp) constitutes a participle (Ppl). This is the minimum sequence. In formula: Pp = Ppl.

13.2.2. The minimum sequence Pp = Ppl may be extended by the addition of a class 610–620 suffix to the participle stem. In formula: Pp + 610–620 = Ppl.

The alternant of suffix 611 that appears after participle stems is -ʔs. Examples are shown after various types of participle stems; the specific Pp is given in parentheses after each example: kaʔuwʌʔs *of the dead person* or *dead person* (as subject of a transitive verb) (kaʔuwʌ *dead person*); minbawʌʔs *of the one coming* (minbawʌ *the one coming*); mʌhataʔmbʌʔs *of the big ones* (mʌhataʔmbʌ *big ones*); ʔʌʔwʌʔs *that one's* (ʔʌʔwʌ *that one*); ʔʌʔtaʔmbʌʔs *those ones'* (ʔʌʔtaʔmbʌ *those ones*); myuspawʌʔs *the one who knows it* (myuspawʌ *that which he knows*); čʌkpawʌʔs *one who does it* (čʌkpawʌ *that which he does*).

Suffix 611 marks genitive or subject of a transitive verb. After a participle stem based on a transitive verb (as in the last two examples above), suffix 611 identifies the participle with the subject of that verb.

Examples with suffix 612 -hiʔŋ (*comitative*) are: kaʔuwʌhiʔŋ *with the dead person* (kaʔuwʌ *dead person*); ʔʌʔwʌhiʔŋ *with that one* (ʔʌʔwʌ *that one*).

An example with suffix 613 -piht(-) (*instrumental*) is: yʌʔwʌpit *by this one* (yʌʔwʌ *this one*).

Examples with suffix 614 -kotoya (*benefactive*) are: minbawʌkotoya *for the one who comes* (minbawʌ *one who comes*); ʔeyawʌkotoya *for another* (ʔeyawʌ *another*); yʌʔwʌkotoya *for this one* (yʌʔwʌ *this one*).

An example with suffix 616 -ʔaŋʌ (*locative*) is: ʔʌʔwaʔŋʌ *to him* or *to his place* (ʔʌʔwʌ *that one* or *him*).

In the following example, suffix 617 -ʔohmo (*locative*) follows a participle stem and is word final: kaʔyahuwʌʔohmo *among the dead* (kaʔyahuwʌ *dead persons*). Suffix 617 may follow a participle stem and be followed by suffix 641: ʔʌʔwoʔmotaʔm *among them* (ʔʌʔwʌ *that one* or *him*).

Examples with suffix 621 -kʌsi (locative *on*) are: minbawʌkʌsi *on the one who comes* (minbawʌ *one who comes*); ʔeyapʌkʌsi *on*

the other (ʔeyapʌ *another*); ʔʌʔwʌkʌsi *on that one* (ʔʌʔwʌ *that one*).

Examples with suffix 622 -kʌsmʌ (locative *above*) are: ʔeyapʌkʌsmʌ *above the other* (ʔeyapʌ *another*); ʔʌʔwʌkʌsmʌ *above that one* (ʔʌʔwʌ *that one*).

Examples with suffix 624 -kʌʔmʌ (locative *below*) are: yʌʔwʌkʌʔmʌ *below this one* (yʌʔwʌ *this one*); ʔʌʔwʌkʌmʌ *below that one* (ʔʌʔwʌ *that one*).

In the following example, suffix 626 -kukmʌ (locative *in the middle of*) follows a participle stem and is followed by suffix 641: ʔʌʔwʌkukmʌtaʔm *among them* (ʔʌʔwʌ *that one* or *him*).

13.2.3. The minimum sequence Pp = Ppl (**13.2.1**) or its extended form Pp + 610–620 = Ppl (**13.2.2**) may be further extended by the addition of certain suffixes of classes 640 and 700. In formula: Pp ± 610–620 ± 640 ± 721 ± 740 ± 731 ± 751 = Ppl.

Suffix 641 -taʔm may follow certain class 610–620 suffixes after certain participle stems. In formula: Pp + 610 or 620 + 641 = Ppl. Examples are: ʔʌʔwʌkukmʌtaʔm *among them* (Pp + 626 + 641); yʌʔwʌkotoyataʔm *for these ones* (Pp + 614 + 641); yʌʔwʌkotoyataʔmdih *for these alone* (Pp + 614 + 641 + 741). Suffix 641 marks plural (but note that the plural is usually marked in participles by suffix 532 or 641 in the form that underlies the participle stem [e.g. kaʔyahuwʌ *dead ones*, mʌhataʔmbʌ *big ones*]).

The order in which suffixes of class 700 occur is similar to the order in which they occur in nouns.

Suffix 721 -ʔa ∼ -aʔM- ∼ -aʔa (*perfective*) appears in certain participle sequences. Examples show suffix 721 with Pp stems based on demonstratives ʔʌʔwʌ *that one* and ʔʌʔtaʔmbʌ *those ones*. The suffix 721 may immediately follow the stem, or suffix 611 may appear between the stem and 721. Examples: ʔʌʔwa *that one already* (Pp + 721 = Ppl); ʔʌʔtaʔmbaʔa *those ones already* (Pp + 721 = Ppl); ʔʌʔwʌʔsa *that one already* (Pp + 611 + 721 = Ppl; subject of a transitive verb).

Suffix 741 -tih (*limitational*) may immediately follow the participle stem, or certain suffixes of class 600 may appear between the stem and 741. Suffix 741 may be word final or followed by suffix 731. In formula: Pp ± 600^{x} + 741 ± 731 = Ppl. In the following examples, suffix 741 is word final (or followed by an enclitic); ʔoyewʌtihteʔ *it is just good* (Pp + 741 − Dm = Ppl − Dm); ʔʌʔwʌtihteʔ *it is just that one* (Pp + 741 − Dm = Ppl − Dm); yʌʔwʌkotoyataʔ-mdih *for these alone* (Pp + 614 + 641 + 741 = Ppl). In the following example, suffix 741 is followed by suffix 731: ʔoyewʌtihsʌʔ-ŋdeʔ *perhaps it is just good* (Pp + 741 + 731 − Dm = Ppl − Dm).

Suffix 742 -mah (*durative*) immediately follows the participle stem in the examples shown; it may be word final or followed by suffix 731. In formula: Pp + 742 ± 731 = Ppl. In the following example, suffix 741 is word final (followed by an enclitic): ʔoyewʌ-mahteʔ *it is still good* (Pp + 742 − Dm = Ppl − Dm). In the following example, suffix 742 is followed by suffix 731: ʔoyewʌ-mahsʌʔŋdeʔ *perhaps it is still good* (Pp + 742 + 731 − Dm = Ppl − Dm).

Suffix 731 -hsʌʔŋ (*potential*) may immediately follow the participle stem, or a suffix of class 740 may appear between the stem and 731. Suffix 731 is word final (followed by an enclitic). In formula: Pp ± 740 + 731 = Ppl. Examples are: ʔoyewʌhsʌʔŋdeʔ *perhaps it is good* (Pp + 731 − Dm = Ppl − Dm); ʔoyewʌtihsʌʔŋdeʔ *perhaps it is just good* (Pp + 741 + 731 − Dm = Ppl − Dm); ʔoyewʌmahsʌʔŋdeʔ *perhaps it is still good* (Pp + 742 + 731 − Dm = Ppl − Dm).

In the following example, suffix 751 -ha (*interrogative*) follows a participle stem: ʔoyewʌhateʔ *is it good?* (Pp + 751 − Dm = Ppl − Dm).

14.0. Particle stems are characterized morphologically by the fact that they are

neither preceded nor followed by affixes. Particle stems (designated Pc) constitute a separate stem class; as particles (designated Pcl) they constitute a separate word class.

14.1. Particle stems (Pc) consist of single morphemes. They may be monosyllabic, dissyllabic, or polysyllabic.

Examples of monosyllabic particle stems are:[49] ʔi *and*, ʔo *or*, pwes *then*, ke *that*, de *of*.

Examples of dissyllabic particle stems are: huka *if*, heke *then*, yaʔu *perhaps*, ʔinʌhk(-) marker of past time or condition contrary to fact (the non-final alternant with h appears before an enclitic pronoun), pero *but*, kwando *when*, hʌʔʌ *yes*, haʔni *no*.

Examples of polysyllabic particle stems are: heneke *isn't that true*, kenekenek expression of amazement.

14.2. Morphological sequences which form particles (Pcl) include only those in which the particle stem (Pc) constitutes a particle (Pcl). In formula: Pc = Pcl.

The following examples show particles in syntactic sequences; the specific particle is given in parentheses after each example): hʌʔʌ *yes!* (hʌʔʌ = Pc = Pcl); haʔni *no!* (haʔni = Pc = Pcl); yʌʔwʌ minba, heneke *this one will come, won't he?* (heneke *isn't that true* = Pc = Pcl); huka minba *if he comes* (huka *if* = Pc = Pcl); minba heke *he comes, then* (heke *then* = Pc = Pcl); mawʌ heke *go then!* (heke *then* = Pc = Pcl); pwes mawʌ *go then!* (pwes *then* = Pc = Pcl); minba yaʔu *he will come perhaps* (yaʔu *perhaps* = Pc = Pcl); maŋba ʔinʌk *he was going* or *he would have gone* (ʔinʌk = Pc = Pcl); nʌ ʔinʌk čahku *he was doing it* (ʔinʌk = Pc = Pcl); ʔoye ʔinʌk *it would be good* (*if true*) (ʔinʌk = Pc = Pcl); maŋba ʔinʌhkʌh *I was going* (ʔinʌhkʌh = Pc − Prn = Pcl − Prn).

[49] Note that monosyllabic particle stems, as well as certain dissyllabic particle stems, are Spanish loans.

REVIEWS

LINGUISTIC BIBLIOGRAPHY FOR THE YEARS 1939–1947. Utrecht-Brussels (Spectrum): Permanent International Committee of Linguists. Vol. I, 1949, xxiv + pp. 1–238. Vol. II, 1950, xxi + pp. 239–589.

A bibliography, in any field, is always a labor of love, for it seldom receives appreciation commensurate with the long and tedious labor involved. The specialist tends rather to criticize than to praise, and it is of course easy to discover lacunae and "important" omissions in any large compilation, and to overlook the bulk of useful material.

The bibliography under review is intended "to fill the gap in our documentation caused by the second world war." It is the work of many scholars; ten are listed as collaborators for the first volume, and eighteen for the second. The work was under the general direction of the Permanent International Committee of Linguists. Publication costs were met by a grant from UNESCO.

As the following sub-divisions attest, the bibliography covers the whole field of linguistics: General Linguistics and Related Branches of Study (I.15–16, II.254–310), Interrelations between Families of Languages (I.61, II.311), Indo-European Languages (I.62–184, II.312–484), "Asiatic" and "Mediterranean" Languages (e.g. Eteocretan, pre-Hellenic, Etruscan, Sumerian, etc.) (I.185–188, II.485–488), Finno-Ugrian Languages (I.189–207, II.489–492), Basque (I.208, II.493), Hamito-Semitic Languages (I.209–220, II.494–504), Negro-African Languages (I.221–224, II.505–510), Caucasian Languages (I.225, II.511–512), Turkish and Mongolian Languages (Altaic Languages) (I.226–227, II.513–521), Dravidian Languages (I.228, II.522–523), Burushaski (I.229, II.524), Languages of Eastern Asia (I.230–232, II.525–534), Austronesian Languages (I.233–236, II.535–540), and American Indian Languages (I.237, II.541–550). Volume II closes with a list of corrections to Volume I (551–552) and an Index of Authors (for both volumes) (553–589).

It is not possible of course for any one reviewer to evaluate a work so broad in scope; evaluation must come from the specialists who use the work and who know the materials in their own fields. In my own field, American Indian languages, the coverage is surprisingly good, taking into account the fact that the work was done in Europe, where it is presumably not always possible to gain easy access to materials published in the Americas. General linguistics (including such related topics as phonetics, phonology, linguistic geography, scripts, alphabets, and orthography, stylistics, and onomastics) seems also to be well covered. A cursory inspection of the journals listed and the Index of Authors reveals no important omissions of American journals, monograph series, or linguists.

The editors are aware of the fact that a work of this scope will have many omissions, and they "appeal to all linguists and invite them to send in . . . any additional data they know of." Such data "will be published in the annual bibliographies which are to appear regularly with supplements for previous years." It is clear, then, that the Bibliography is a project of continuing importance, the usefulness and accuracy of which will increase as yearly additions and corrections are made. The Committee and its collaborators are to be congratulated for their labors on behalf of the science of language.

HARRY HOIJER
UNIVERISTY OF CALIFORNIA, LOS ANGELES

GENERAL PHONETICS. By R-M. S. Heffner. With a Foreword by W. F. Twaddell. Madison: The University of Wisconsin Press, 1949. Pp. xx + 253.

This book has been strongly influenced by the author's teachers, Grangent and Hoch-

doerfer, and is dedicated to them. It is also, in part, a compilation of what is known in phonetics, and, incidentally, provides a bibliography to the subject since the author has 'in the notes, fully acknowledged every obligation, however slight, in that respect.' (p. ix).

The compilation aspect of the work adds to its value in a field which 'is being blessed with additions of data through startling new techniques and devices (electronics, high-speed X-ray photography) and through an increased number of languages under observation' as Twaddell says in his Foreword (p. vii). Before turning to the problem of the 'increased number of languages under observation,' it should be noted that Heffner's book is not only a most useful compilation, but is also eclectic. In his Introduction (Chapter I), the author contrasts 'genetic investigation' (examination of movements of speech organs which produce sounds) with 'gennemic investigation' (examination of sounds after they have been produced), but concludes that 'Neither approach may be properly ignored.'

Chapter II is concerned with the 'Physiology of Speech' (pp. 9–41) and includes the anatomical diagrams of the so-called speech organs which are notably clear, accompanied by a text which focuses on what happens in the movements of the parts diagramed when we talk. Chapter III is called 'The Physics of Speech Sounds' (p. 42–57) but includes also the physiology and anatomy of the speech receptor; the diagram and the description of the inner ear are models of elementary exposition.

The rest of the book ('Part Two: The Sounds of Speech') reflects Grangent's influence in phonetics. It is all presented as a convenient review of the subject, and adopts a repetitive type of technical terminology which is presumably effective for learning the subject for the first time. For example, the simple stops are said to be velar stops, mediopalatal stops, palatal stops, alveolar, gingival, dental stops, labial stops. For each of those, Heffner gives the articulatory points which determine the type names, and then adds (and repeats in each case) characteristics which determine possible variety, such as 'voiceless or voiced' and 'fortis or lenis' and 'impulsive or affricative or suction' and 'aspirated or unaspirated or affricative'. All the curious and varied symbols used in this particular phonetic tradition are employed—presumably for pedogogic clarity. One gains the impression that Heffner gives a summary of all the phonetic variety known in the languages of the world. Though the author achieves a world wide scatter of languages cited, and cites literature more particularly devoted to a detailed description of sound production, he does not begin to summarize (much less exhaust) the languages on which we have phonemic information.

Since writing the above, I have read Norman A. McQuown's review of Heffner (Lg. 27.344–62), which made me realize that I must now add an explicit disavowal to a possible implication. It is true, as I just said, that Heffner does not comprehensively cover the phonetics of all languages of the world; it is probable that we have enough published material to give us a fair sample to enable us to accomplish such a task. Stated in another way—if I were to write a book on general phonetics, I would try to accomplish this task (partly because I am imbued with the naturalist-like approach to language which sets its goal—like that of the systematist in botany or zoology—on comprehensive sampling and systematic inclusion of all diversity and similarity obtainable). But the fact is that Heffner is imbued with other approaches to language, and hence he is not open to criticism for failing to follow, in every last detail, what particularly intrigues me. Heffner's book—in terms of its own approach to language—is, like Caesar's wife, beyond reproach.

C. F. VOEGELIN
INDIANA UNIVERSITY

A BIBLIOGRAPHY OF NORTH AMERICAN FOLKLORE AND FOLKSONG. By Charles Haywood. New York: Greenberg, 1951. Pp. xxx + 1292.

Haywood of the Music Department of Queens College and his publisher Greenberg have here made available a monumental complement to the recent Funk and Wagnall Encyclopaedia of Folklore. Its 40,000 items are as compact in their one-volume presentation as their coverage is complete. Folklore is treated as "not a survival, but a living organism."

The nature of the work will be most evident from an analysis of its content distribution. It is divided into two "books," on the American People and the American Indians, both north of Mexico, the former about twice as long as the latter—750 pages as against 400. Book One has five Parts. Part I is a general Bibliography of 170 pages, nearly two-thirds of them devoted to Folksong. Part II, Regional, has 250 pages, grouped by seven American and Canadian areas. Part III is Ethnic, more than two-thirds of its 180 pages being given to the Negro, the remainder to non-Englishspeaking groups. As might be expected, Negro Folksong outweight Folklore. Parts IV and V, each around 60 to 70 pages, are devoted respectively to Occupational Folklore (Cowboys, Miners, Lumberjacks, Railroaders, Sailors, Hobos) and to Miscellaneous (American Characters, Our Wars, The Shakers, White Spirituals).

Book Two, on Indian Folklore, consists of a general part of 75 pages, and 335 pages of references to titles grouped by ten culture areas. This is the largest of the seven parts of the book. The space allotment is: Northeast 68 pages, Plains 54, Southwest 46, Northwest 36, California 32, Eskimo 30, down to Great Basin 12—each page representing thirty to forty times as many separate bibliographical references.

There is a three-column Index of 134 pages. The key to abbreviations used for serial publications, musical publications, and "brands" or series of phonograph records fills eight pages. Some sample checks made revealed no omissions of titles and no errors of indexing. Maps cover the assignments to American regions and of Indian tribes to culture areas. The work has evidently been done conscientiously and has come out exact. It will be an indispensable tool for research in its field, and a must for all libraries serving scholars as well as the growing number of amateurs interested in folklore.

A. L. KROEBER
COLUMBIA UNIVERSITY

RECENT PUBLICATIONS

A. General Linguistics

Cowan, George M. An Experiment with a Wire Recorder in Teaching General Phonetics. Lg. Learning 2.76–82, 1950.

Haas, Mary R. Interlingual Word Taboos. AA 53.338–344, 1951.

Harris, Zellig S. Methods in Structural Linguistics. Chicago: Univ. of Chicago Press, 1951. xv + 384 pp.

Martin, Samuel E. Language Study Techniques. Inst. of Far Eastern Studies, Yale Univ., 1951. 18 pp.

Voegelin, C. F. & Harris, Zellig S. Methods for Determining Intelligibility among Dialects of Natural Languages. Proc. Amer. Phil. Soc. 95.322–329, 1951.

B. American Indian Languages

Andrews, Enriqueta. Vocabulario Otomi de Tasquillo, Hidalgo. Mexico: Inst. Ling. de Verano, 1950. 82 pp., mimeog.

Anon. Vocabulario Mixteco de San Miguel el Grande, Oaxaca. Mexico: Inst. Ling. de Verano, 1951. 41 pp., mimeog.

Aschmann, Pedro. Vocabulario Totonaco, Coordinación Alfabético del Totonaco de la Sierra de Veracruz y de Puebla. Mexico: Inst. Ling. de Verano, 1950. 246 pp., mimeog.

Bibliographic Bulletin of American Anthropology. Vol. 13, Parts I and II, 1950.

Mexico: Inst. Panamericano de Geographia e Historia, 1951. 317 + 301 pp.

Franciscan Fathers. A Stem Vocabulary of the Navaho Language. Vol. I. Navaho–English, 340 pp.; Vol. II. English—Navaho, xlv + 327 pp. St. Michaels, Arizona, 1951.

Hoijer, Harry. Cultural Implications of Some Navaho Linguistic Categories. Lg. 27.111–120, 1951.

Kotschar, Vincent F. Tribal and Linguistic Map of Vancouver Island and Adjacent Territory. In Helen Codere, Fighting with Property, Mono. 18, AES. New York, 1951.

Larsen, Kay. Huastecto Baby Talk. El Mexico Antiguo 7.295–298, 1949.

Pike, Eunice V. Texts on Mazateco Food Witchcraft. El Mexico Antiguo 7.287–294, 1949.

Schneider R., Robert. The Work of the Summer Institute of Linguistics [in the Peruvian Amazon.] Bol. Indigenista 11. 160–173, 1951.

Slocum, Mariana C., with Egberto Dyk y Sra. Vocabulario Tzeltal, Breve Coordinación Alfabética de una Lengua Mayance del Estado de Chiapas. Mexico: Inst. Ling. de Verano, 1950. 54 pp., mimeog.

Waterhouse, Viola. Oaxaca Chontal: Sentence Types and Text Analysis. El Mexico Antiguo 7.299–314, 1949.

Williams, Ann and Pierson, Esther. Diccionario Español—Popoloca y Popoloca—Español. Mexico: Inst. Ling. De Verano, 1950. 32 pp., mimeog.